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# Commodore
## MAGAZINE

SEPTEMBER 1987, *Volume 8, Number 9*


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## FEATURES

To the Editor:

I recently constructed the speech synthesizer circuit from the June 1987 issue of *Commodore Magazine*. The article was called *Interfacing Commodore's User Port, Part Two.*

I encountered a few problems when constructing the circuit, the major one being pins five and six of the LM386. The pins are reversed in the schematic. Pin five should be the output and pin six the +5 volt line. Also, the pins G and I don't exist on the 64 user port. Pin 14 should be connected to H, pin 13 to J, pin 8 to K and pin 20 to L. This really wasn't confusing if you followed a straight line from C without checking.

The parts list calls for three, .luf capacitors. The schematic has two .0luf capacitors. I used the .luf caps, and made the pin changes. Mine works great.

*Thanks,*
*Harold V. Martin*

*Editorial Response: We apologize to all of our readers who had problems with this circuit because of errors in the magazine. The "How To" articles and circuits are something new to our magazine, and we're still learning the ropes. At least it's encouraging to know that readers are interested! Watch for more of these build-it articles in the future — hopefully without the errors.*

To the Editor:

I am writing about the June 1987 issue of *Commodore Magazine*. However, this is *not* really a letter of complaint, but rather to chide you a bit.

On the copy I received, and I assume all others, the first program listed on the cover was *How to Build a Speech Digitizer*, I eagerly grabbed up the magazine because the method and program I use to digitize voice and sound leaves much to be desired. When I read the article I must admit I was disappointed — it was on building a synthesizer, *not* a digitizer! I realize somebody made a "boo-boo" and I hope in an upcoming issue you *will* have an article on digitizing speech.

Keep up your good work and watch out for "bugs" in your proofreader.

*Sincerely,*
*Jimmy Ward*

*Editorial Response: We hope that you look at every issue on the newsstand, because the August 1987 issue has just the article you are looking for — How to Build an Audio Digitizer.*

To the Editor:

This is in reference to Jeffery Hersk's Technical Tips article, *How to Keep Your Drive Alive*, in the June issue. Although well written and strikingly illustrated, there are some errors of both commission and omission that could cause the unwary frustration and possible heavy expense.

Since my 1541 needed some minor repairs anyway, this article prompted me to attempt them myself. After all, my drive is fours years old. Voiding the warranty is no longer a problem, and if I fail, my local service center would still be willing to take my money. I failed, and they did! While at the shop I listened to some interesting observations by the technician.

Firstly, and most serious, he was adamant that petroleum jelly should *never* be used. It does not flow but goes on "gobby". Without extreme care, some may get on the head and then onto a disk or two. Goodbye disks! However, his major concern was that some may drip down onto the belt. Now we're talking heavy expense! He strongly recommended that only a very judicious application of light mineral oil, which flows smoothly, be used.

As far as alignment and timing goes, one may or may not be successful. It may take a lot of extreme patience and then you may only achieve an accuracy barely within tolerance levels. Again my serviceman pointed out that they have the dedicated equipment and experience to give bang on performance. This is critical with certain programs that require precise speed and alignment.

One final matter. If you own the older Alps model, such as mine, you are in for a lot more fun. The illustration showing the exposed drive head and rails is not what you will see when you remove the top from an older Alps drive. These parts are hidden under the circuit board! If you wish to clean the head and lube the rails it will be necessary to remove the circuit board from the chassis. This will require you to remove five tiny screws from around the top perimeter of the board, as well as two on the right side towards the back. You will also need to unplug several banks of wires and try to recall later how they were plugged in. I hope your frustration threshold is not too low.

For myself, it was an interesting experience that I would not have missed and I got off cheap at $26.00 for repairs. The old adage still applies — if it's working, don't fix it!!

*Yours truly,*
*Louis Black*

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# THE COMMODORE AMIGA 500



Commodore has released the Commodore Amiga 500, directly following the official U.S. introduction at June Comdex. According to Alfred Duncan, general manager, Commodore Business Machines, Inc., the Amiga 500 represents "a computer that retails for about half as much as the Amiga 1000 yet retains all of the performance capabilities—including advanced graphics and video, four-channel sound, built-in speech synthesis and multi-tasking—in a lower priced unit."

The Amiga 500 integrates a full style keyboard, central processing unit and 3.5-inch disk drive with 512K of RAM standard. Memory can be expanded to one megabyte internally with the A501 RAM expansion cartridge, which also includes a battery-backed real-time clock.

The Amiga 500 has a suggested list price of $699 which includes ROM-resident V1.2 Kickstart (kernal), AmigaDOS, Workbench (the icon and window based user interface), AmigaBASIC from Microsoft Corporation and a two button opto-mechanical mouse.

# COMMODORE AMIGA 2000




Commodore introduced the new Amiga 2000 at June Comdex. The Amiga 2000 features an open architecture with seven internal slots, a multitasking 68000-based operating system, one 3.5-inch 880K drive, and one megabyte of memory standard. Memory can be expanded internally to 9 megabytes of contiguous memory.

Commodore also introduced the A2088 Bridgeboard, a plug-in card with an 8088 microprocessor and 512K RAM, that provides IBM PC/XT compatibility. Other boards introduced by Commodore at the show include the A2050 two megabyte RAM card, the A2090 hard drive controller card, and a genlock card.

Commodore also previewed the A2086 Bridgeboard for the Amiga 2000. This board, which contains an 80826 microprocessor, will fit into one of the two bridge slots and provide the Amiga 2000 with complete IBM PC/AT compatibility.

The Amiga 2000 has a suggested list price of $1995.

## Wanted—Amiga Tips & Tricks

Starting in the October issue of Commodore Magazine will be a Tips & Tricks column for the Amiga. Workbench, CLI and AmigaBASIC tricks will all be published monthly in this new column. If you have a tip, a trick, or a hint for the Amiga or for a piece of software, send it in! Send all tips and tricks to:

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## Into The Eagle's Nest

Mindscape, Inc. has announced Into the Eagle's Nest, a World War II combat arcade game, for the Commodore 64. Your mission is penetrate the Eagle's Nest, a top secret Nazi fortress, rescue three allied saboteurs and destroy the fortress.

Gameplay takes place within the Eagle's Nest, with four floors, elevators and high-resolution scrolling graphics.

Into The Eagle's Nest is $29.95, and an Amiga version is expected in the fall. For more information, contact Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062. Or call: (312)-480-7667.

*Continued on pg. 10*

## SPECIAL USER GROUP PROMOTION

Commodore 64 and 128 user groups should watch their mailboxes for a special promotion coming their way from Commodore. No details can be given yet other than it's sure to be a deal that can't be refused.

## The Professional Page

Gold Disk, Inc. has announced Professional Page, an advanced desktop publishing package for the Amiga. Standard features include a full-featured word processor, algorithmic and discretionary hyphenation and typesetting features such as kerning, tracking, leading and baseline shifts. In addition, Professional Page offers many advanced features currently not available in any Amiga desktop publishing package, such as color picture information that is maintained in system with grey level halftones displayed, structured graphics with tools to create and edit lines, rectangles, circles, ellipses and freehand drawings, and the ability to combine, rotate size, move and reflect pages before printing.

Professional Page requires one megabyte of RAM and is expected to be released in September. For more information and pricing, contact Gold Disk, Inc., P.O. Box 789, Streetsville, Mississauga, Ontario, Canada L5M 2C2. Or call: (800)-387-8192.



## COMMODORE PC10 PRICE REDUCTIONS

Commodore has announced a price reduction on the PC10-1 and PC10-2 IBM compatible computers. Effective immediately, the prices for a PC10 with a monochrome or RGB monitor are as follows:
PC10-1 with Commodore 1901 monochrome monitor—$799.95
PC10-2 with Commodore 1901 monochrome monitor—$899.95
PC10-1 with Commodore 1902 RGB color monitor—$999.95
PC10-2 with Commodore 1902 RGB color monitor—$1099.95

The PC 10-1 and PC10-2 are both equipped with an Intel 8088 microprocessor running at 4.77 MHz, five full expansion slots and an ATI graphic solutions adaptor. Bundled software includes MS-DOS 3.2, GW BASIC and Borland's Sidekick.

The PC10-1 has 512K of RAM and one 360K double sided 5.25-inch floppy, and the PC 10-2 has 640K of RAM and two 360K double sided 5.25-inch floppies.

## MOUSE CLEANER 360

Ergotron, Inc. has released Mouse Cleaner 360, a cleaning system, for the Amiga mouse, the 1350 and 1351. Mouse Cleaner 360 is designed to clean the tracking rollers inside the mouse and eliminate jerky movements and slow response. The kit consists of a Velcro covered scrubber ball, a scrubber board, a Chamois cloth and a bottle of cleaning solution.

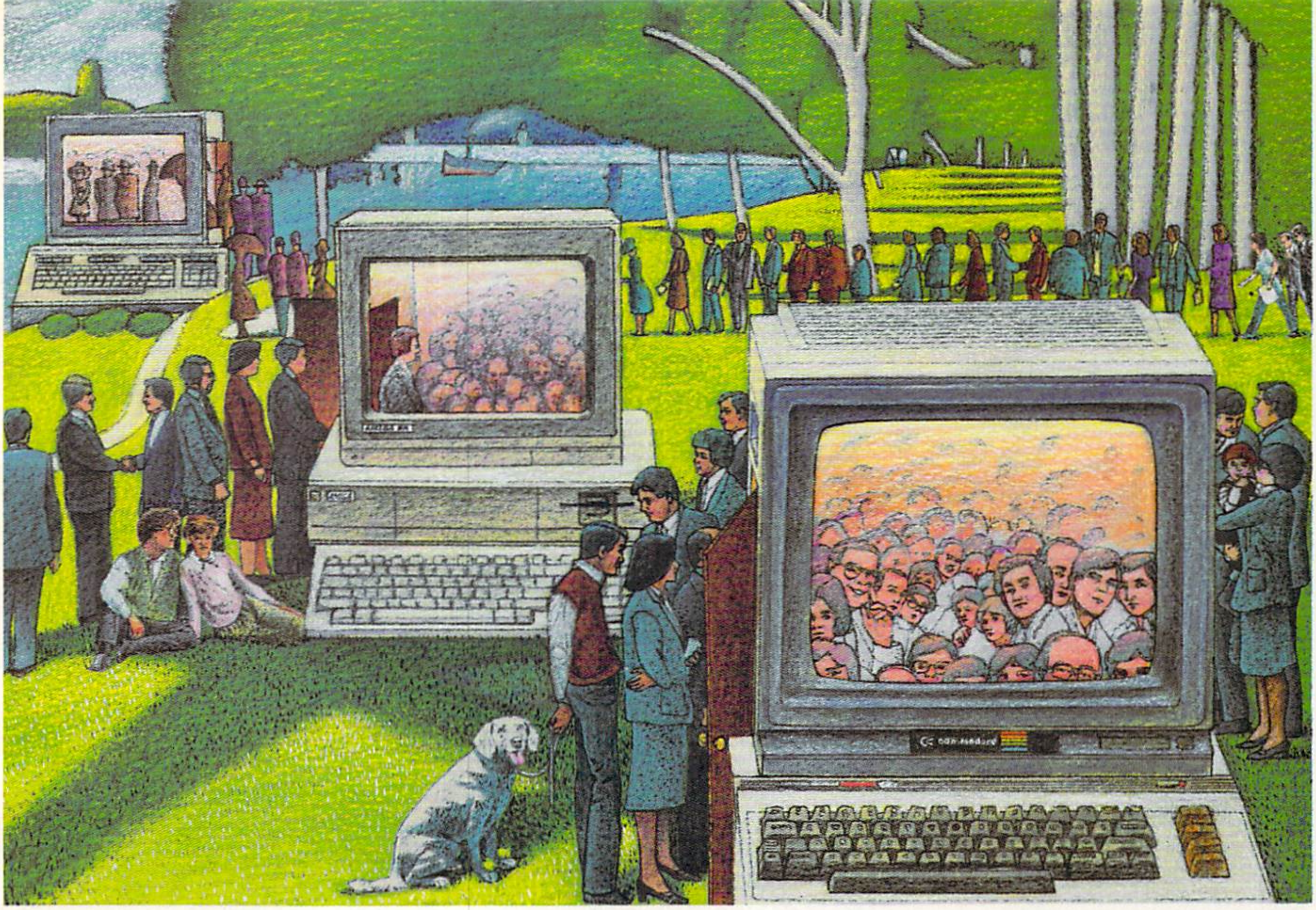
The cost of Mouse Cleaner 360 is $16.95. For more information, contact Ergotron, Inc., 1621 East 79th Street, Minneapolis, MN 55420. Or call: (612)-854-9116.




## B-24 FLIGHT SIMULATOR

Strategic Simulations has released B-24, a real-time flight simulator, for the Commodore 64. The player is part of the 406th Bombardment Group during World War II, and takes on the role of the pilot, co-pilot, navigator, engineer and bombardier. In addition, as the lead plane, the player needs to determine the flight path, speed, altitude and bomb drop points for the formation. Adjustable variables include engine performance levels, reliability of

Continued on pg. 12



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*Continued from pg. 10*

escorts, probability of being intercepted, bombing accuracy and weather conditions.

B-24 is available for $34.95. For more information, contact Strategic Simulations, Inc., 1046 N. Rengstorff Ave., Mountain View, CA 94043. Or call: (415)-964-1353.

# CAULDRON

Broderbund Software has announced the release of Cauldron, a spooky arcade adventure game for the Commodore 64. Previously a top seller in the United Kingdom, Cauldron includes two complete games: Cauldron and Cauldron II. The object of the games is to collect the correct ingredients to brew a magic spell. In Cauldron, you are a Witch Queen after her golden broom stolen by the Pumpking. In Cauldron II, you are a pumpking warrior after the Witch Queen.

Cauldron is available for $29.95. For more information, contact Broderbund Software, Inc., 17 Paul Drive, San Rafael, CA 94903-2101. Or call: (415)-479-1700.

# The Lurking Horror

Infocom has announced The Lurking Horror, an interactive horror story for the Commodore 64 and Amiga. As a new student at the George Underwood Edwards (G.U.E.) Institute of Technology, the player must explore the underground realm of the old campus. The setting consists of basements, old storage rooms, underground tunnels and slimy passageways, all pulling you into a frightening nightmare.

The Lurking Horror is $34.95 for the Commodore 64 and $39.95 for the Amiga, and includes a copy of G.U.E. At a Glance and a student I.D. card. For more information, contact Infocom, Inc., 125 Cambridge Park Drive, Cambridge, MA 02140. Or call: (617)-492-6000.

# LEGACY OF THE ANCIENTS

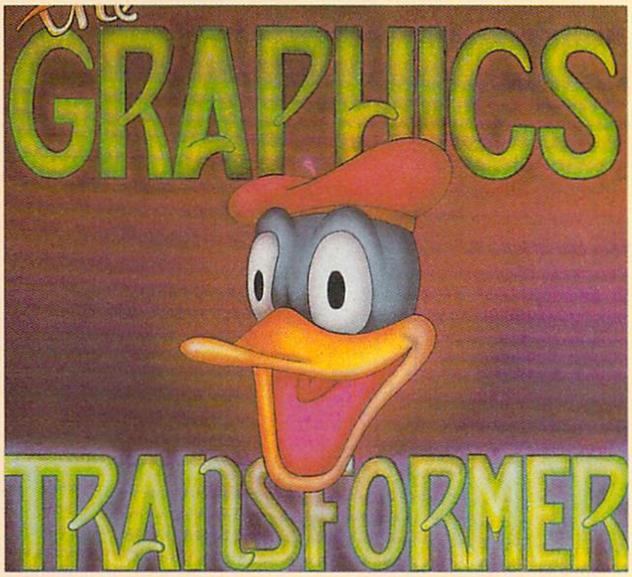
Electronic Arts has released Legacy of The Ancients, a fantasy adventure game for the Commodore 64. Players travel through the world of Tarmalon, on a quest for the lost "Wizard's Compendium." The land of Tarmalon contains 12 towns, forests, castles and dungeons. Towns include places to purchase armor, obtain magic spells, rob banks and gamble. Legacy of The Ancients also includes five action games which can increase the player's skills and treasure.

Legacy of The Ancients is available for $29.95. For more information, contact Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404.

# PIRATES!

Pirates!, an adventure/simulation, is the newest release from MicroProse Software. As a 17th century pirate captain, you must deal with control of your own ship as well as engaging in ship-to-ship duels to gain your fortune and build your reputation. Other features include sword fights, land battles, boarding other pirate ships, and changing weather conditions. Players can choose to play in six different time periods or re-create famous expeditions.

Pirates! is available for the Commodore 64 for $39.95. For more information, contact MicroProse Software, Inc., 120 Lakefront Drive, Hunt Valley, MD 21030. Or call (301)-771-1151.

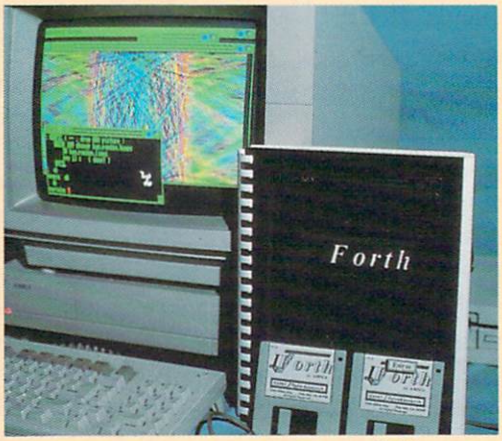



# THE GRAPHICS TRANSFORMER

The Graphics Transformer, a graphics utility package for the Commodore 64 has been released by Complete Data Automation, Inc. The Graphics Transformer allows you to transfer graphic screens between different packages. Over 20 different packages are supported including GEOS, Print Shop, Flexidraw and Koala. In addition any graphic screen can be converted into a stand-alone fast loading file.

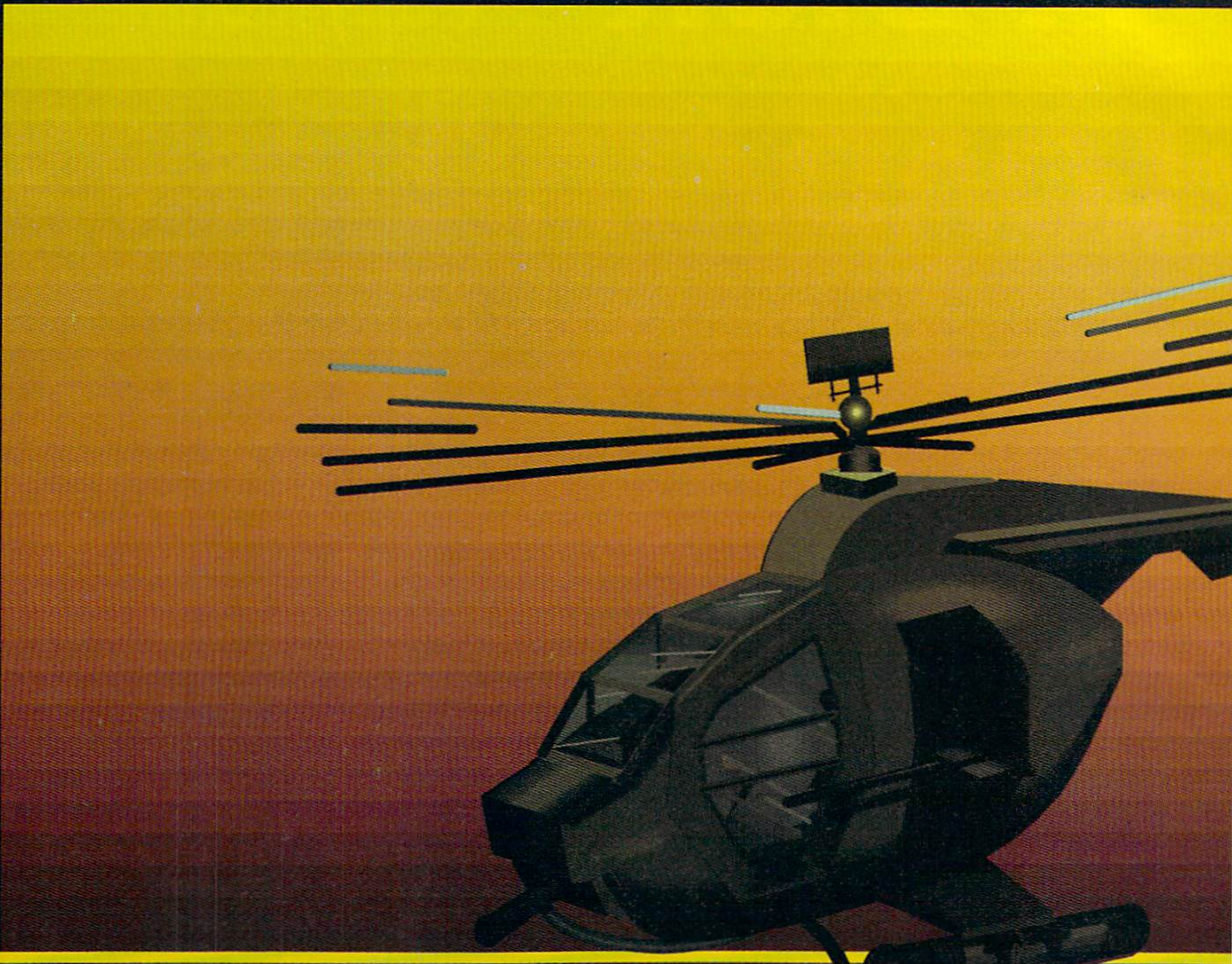
The Graphics Transformer is available for $34.95. For more information, contact Complete Data Automation, Inc., P.O. Box 1052, Yreka, CA 96097. Or call: (916)-842-3431.

# JForth For Commodore Amiga



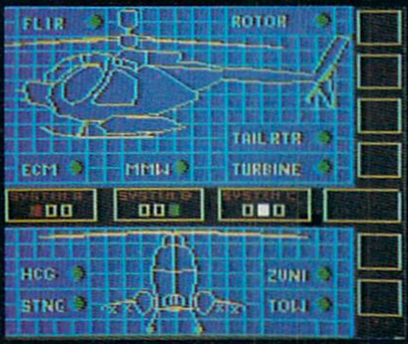

Delta Research has announced JForth, a Forth development environment, for the Amiga. Based on the Forth '83 standard, and supporting both FIG and Forth-79 standards, JForth provides an interactive environment and an incremental compiler. Utilities provided include a 68000 assembler and disassembler, a floating point package, and search and sort routines. Demonstration programs include graphics, HAM mode, speech, and menus. In addition, all Amiga library routines can be called by name and compiled files can be sold without royalties.

JForth is available for $99.95 which includes a free newsletter and updates. For more information, contact Delta Research, 3867 La Colina Road, El Sobrante, CA 94803. Or call: (415)-485-6867.



**In a market full of helicopter simulations like Super Huey II, Gunship, and Infiltrator, it's nice to find a product like ThunderChopper that flies high above the rest!**

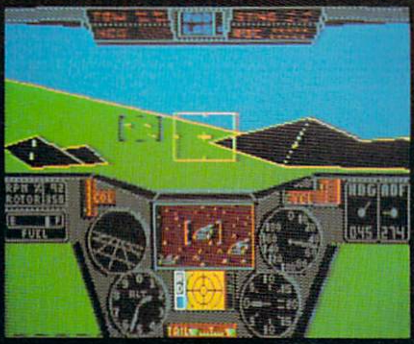
Colonel Jack Rosenow USAF (Ret.), President of ActionSoft Corp., has the experience to provide all of the helicopter action and strategy you've been looking for! ThunderChopper incorporates the most advanced graphics, flight systems, and game-playing factors to provide a sensational balance of strategy and fun:



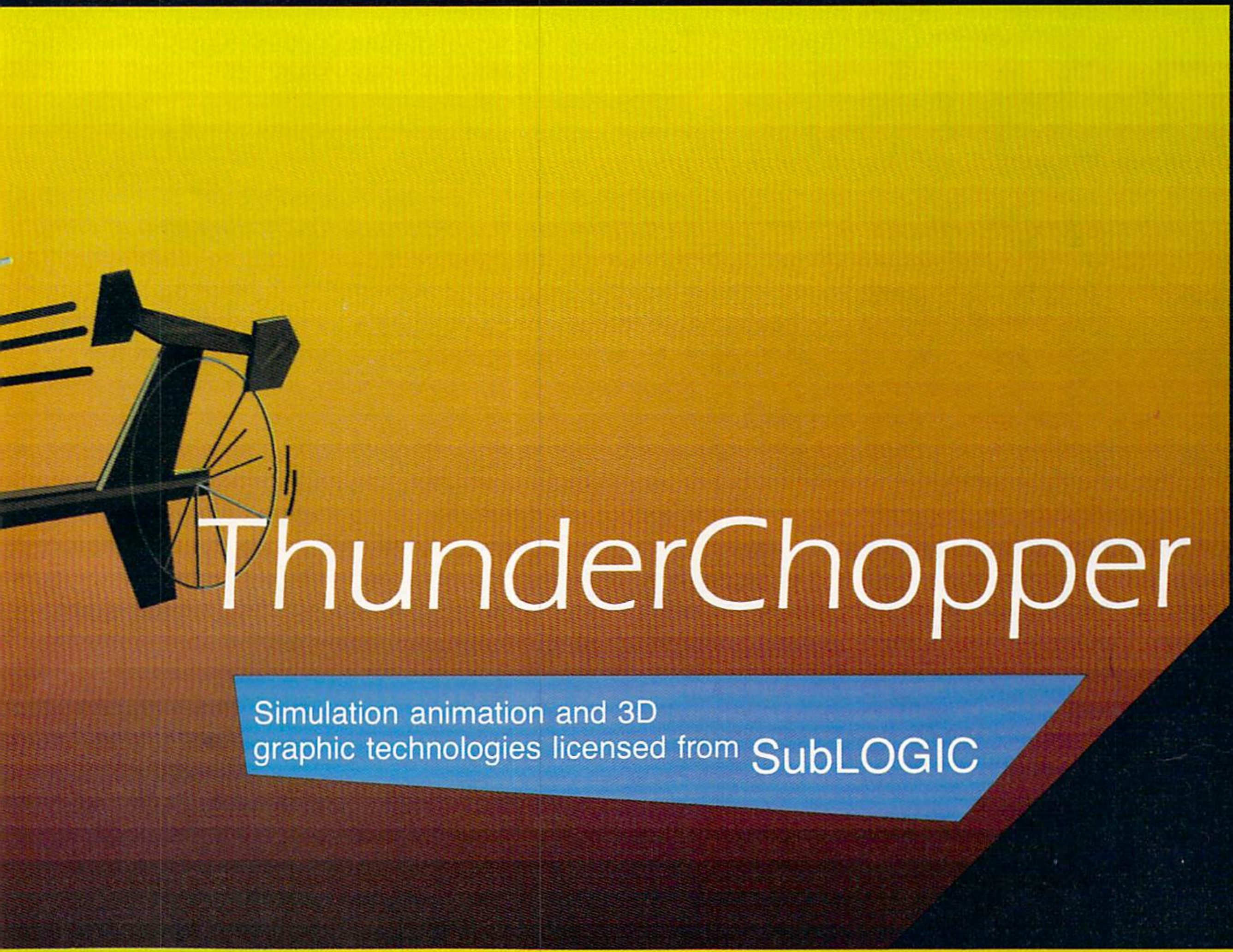

- Action-packed animated graphics include real 3D scenery and airborne threats. The competition's graphics just don't compare.

- A sophisticated instrument panel lets you scan all vital information at a glance whether performing combat, exploration or rescue operations. ThunderChopper's advanced instrumentation includes Forward-Looking Infra red, CO2 laser radar, zoom television, and ECM. Armament includes TOW and Stinger missiles, a Hughes Chain Gun, and Zuni rockets.

- Better program and documentation design gets you up flying exciting combat missions in minutes.



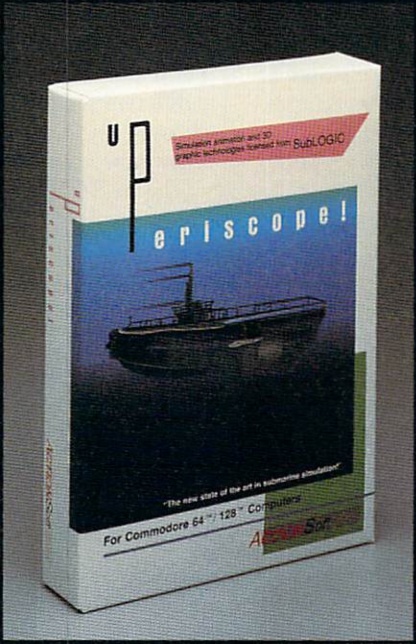
As Colonel Jack says: "ThunderChopper is the ultimate in helicopter action and realism. Nothing else even comes close. No other simulation can boast this much fun!"




**Up Periscope!**

The new state of the art in submarine simulation. The superior strategic play action and 3D animated graphics of this simulation put it generations ahead of the pack.

See Your Dealer...
Or write or call us for more information. ThunderChopper and Up Periscope! are available on disk for the Commodore 64/128, Apple II, and IBM PC line of personal computers for the suggested retail price of $29.95. For direct orders please specify which computer version you want. Include $2.00 for shipping and specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club cards accepted.




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# LOU SANDER'S Tips & Tricks

## Hints for Fun and Utility

As usual, this month's tricks are the very best from a great number of submissions. If you have an idea that you'd like to share with others, write it up and send it in. (One trick per sheet of paper, please.) We pay from $10 to $50 for every tip or trick we use. Send them to:

Louis F. Sander
P. O. Box 101011
Pittsburgh, PA 15237

**Castle siege:** In this action-packed little game, you besiege an enemy castle with the awesome power of a medieval catapult. Your boulders, if fairly launched and true, smash parts of the castle to dust. You can erase it completely with five perfect shots, but such devastating skill is only acquired through practice.

When you run the program, your catapult and the enemy fortress appear at the bottom of the screen, and you're asked to choose the elevation angle for your shot. Maximum distance is obtained at 45 degrees. Low elevations give flatter trajectories. Your catapult will not fire self-destructive vertical shots.

May your men be brave. May your weapon be strong. May your victory be total and swift.

*Bob & David Snader*
*Baltimore, Maryland*

```
10 PRINT"[WHITE,CLEAR,L. BLUE,RVS,
   SPACE3]CASTLE SIEGE - BOB & DAVID
   SNADER[SPACE4,L. GREEN]":F=6
   :Q=RND(TI)*16+1876
20 DATA 000,091,039,127,040,241,041,
   255
30 DATA 076,127,077,241,078,255,080,
   194
40 DATA 117,194,118,160,119,251,120,
   160
50 FOR J=0 TO 11:READ L,M:POKE Q+L,M
   :NEXT
60 POKE 53281,0:S=54296:V=53248
   :POKE 2040,13:POKE 832,128
   :POKE V+29,1:POKE V+39,1
70 IF F=1 THEN PRINT"[DOWN4,L. RED]
    GAME OVER! YOU GOT[L. GREEN]";H;"
   [L. RED]POINTS.[DOWN2,L. BLUE]":END
80 POKE V+21,0:POKE 1985,105
   :POKE 1986,95:POKE 1945,70:X=38
   :Y=230:G=0:F=F-1
90 PRINT F;"[L. BLUE]SHOTS TO GO."
   :INPUT"[DOWN,GREEN] ELEVATION
   (1-88 DEG)";D:PRINT"[HOME,L. GREEN]
   "
100 IF D<1 OR D>88 THEN 90
110 R=[PI]/(180/D):A=TAN(R)
    :B=3.3*COS(R):POKE 1945,77
    :POKE V+21,1:POKE S,15:POKE S,0
120 X=X+B:Y=Y-(B*A)+G:G=G+.05
    :IF X>255 OR Y>250 THEN FOR J=0
    TO 999:NEXT:GOTO 70
130 POKE V,X:POKE V+1,Y
140 IF PEEK(V+31)=1 THEN POKE
    1024+INT((Y-50)/8)*40+INT((X-24)
    /8),32:H=H+1:POKE S,15
150 POKE S,0:GOTO 120
```

**All about STOP and RESTORE:** The STOP key is on the left side of your keyboard, just above the Commodore key. If you press it while running a BASIC program, it causes an immediate halt, unless the program is waiting for INPUT from the keyboard.

As you've probably noticed, the key is labeled RUN as well as STOP. That's because when it's shifted, it automatically loads and runs a BASIC program. The particular program it chooses depends on your computer and what you've been doing with it lately. In the 64, the RUN key loads and runs the next program found on the datasette. If you have a 64 but don't use tapes, you won't be able to use RUN.

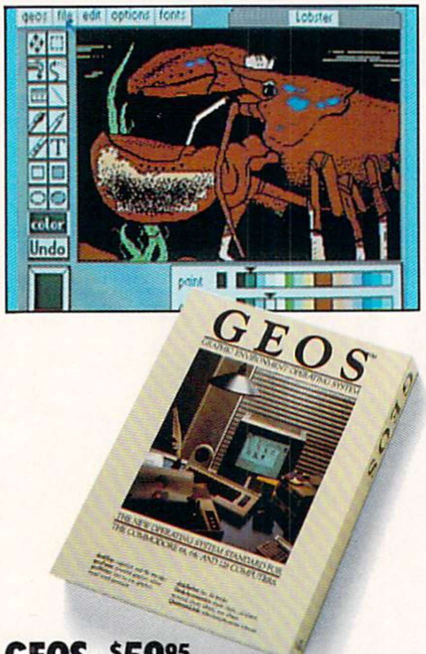
On the 128 and SX 64, the RUN key loads and runs a program from the default disk drive, normally drive #8. In most cases, that program will be the first one shown in the directory, but that's not always the case. If you've recently saved or loaded a different program, that program may be the one that RUN chooses. If you experiment with your own computer, you'll soon know how it works.

The RESTORE key is in the upper-right corner of your keyboard, just below INST/DEL. To use it, depress STOP, and while that key remains depressed, give RESTORE a sharp tap, similar to what a wood-pecker would do. (Unlike the other keys, RESTORE is connected to a circuit that detects an instantaneous change in status. If you're too gentle with the RESTORE key, the circuit can miss your keypress.)

Pressing STOP and RESTORE will break out of almost any program, including a BASIC program executing an INPUT statement. In addition, STOP/RESTORE resets the computer to its power-up configuration for colors, sound and graphics. When you do a STOP/RESTORE, the normal screen, border and character colors will return, and all sound registers will be reset; all sprites will vanish from the screen. On the 128, the 40/80 DIS-

*Continued on pg. 125*

# IF YOU STILL THINK CO
# PLAY AROUND



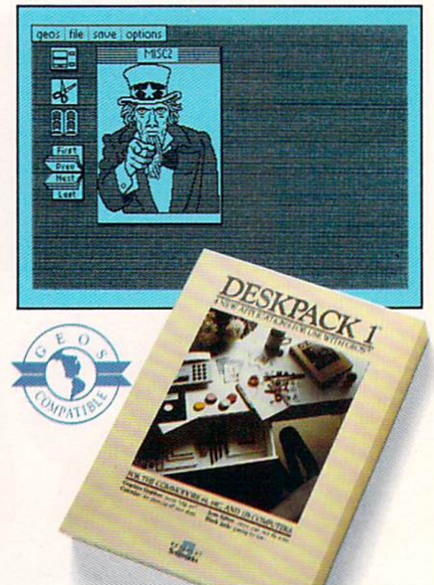

## GEOS $59^{95}

The Graphic Environment Operating System that opens up a whole universe of new possibilities for Commodores. With geoWrite, geoPaint, fast-loading diskTurbo and support for all GEOS-compatible applications.

## FONTPACK 1 $29^{99}

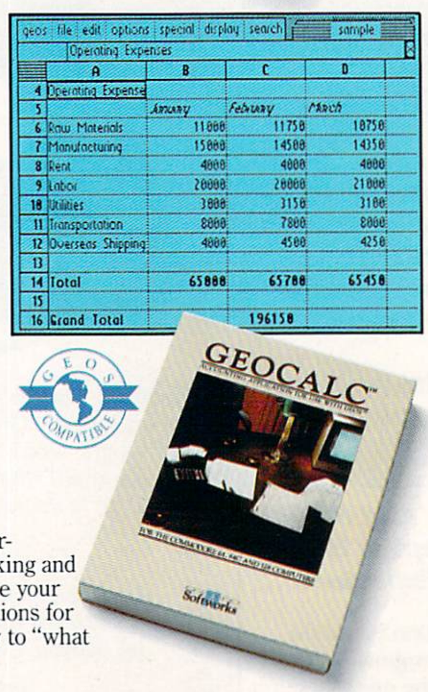
A collection of 20 more fonts for use with GEOS applications, in various shapes and sizes for more expressive and creative documents.



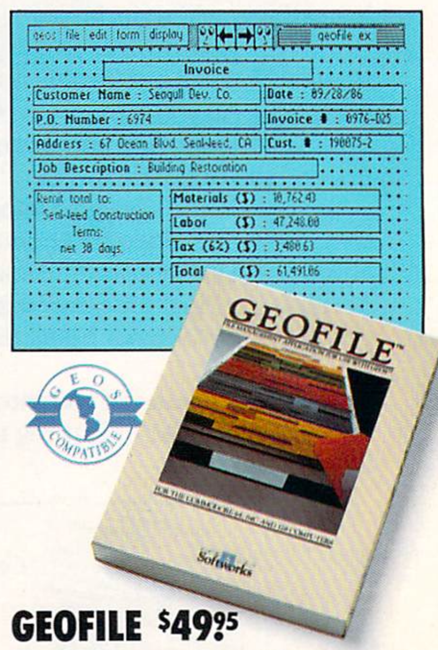

## DESKPACK 1 $34^{95}

Four GEOS-compatible applications: Graphics Grabber for importing art from Print Shop,™ Newsroom™ and Print Master™ graphics; Calendar; Icon Editor and Black Jack Dealer.




## GEOCALC $49^{95}

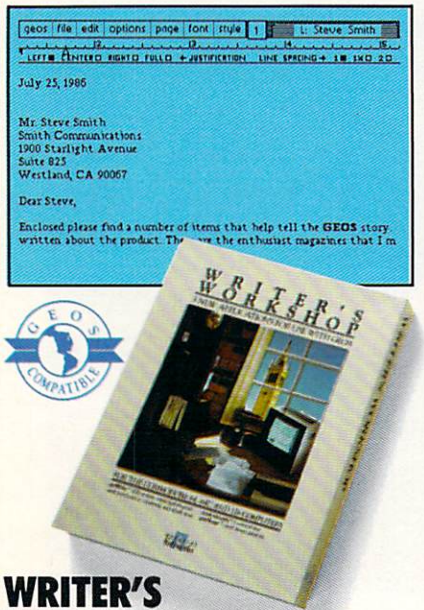
The GEOS-compatible, number-crunching spreadsheet for tracking and analyzing numerical data. Create your own formulas, perform calculations for anything from simple geometry to "what if" cost projections.




## GEOFILE $49^{95}

The GEOS-compatible database manager that sorts, edits and prioritizes whatever data you feed it. You fill out the "input form," specify your command, and geoFile takes it from there.

# MMODORES ARE TOYS, WITH THESE.

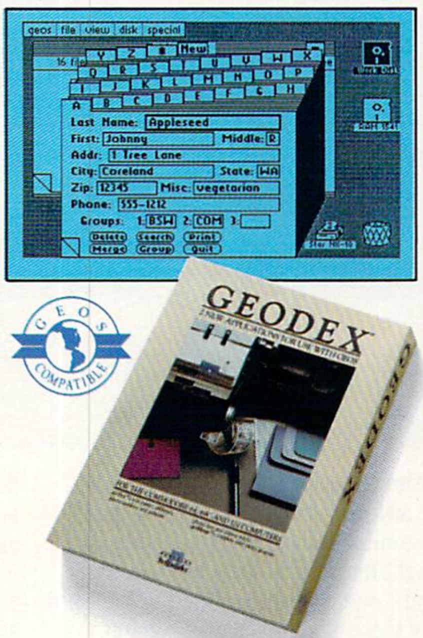



## WRITER'S WORKSHOP $49⁹⁵

All the GEOS-compatible tools a writer needs, including geoWrite 2.0 with headers, footers and features to justify, center, search and replace text. Includes a Text Grabber (for converting text from programs like Paper Clip™), geoMerge and LaserWriter printing capability.

## GEODEX $39⁹⁵

The GEOS-compatible directory that allows you to create lists by name, address, phone number, etc. Includes geoMerge to customize form letters and invitations.




## GEOPRINT CABLE $39⁹⁵

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So if you're tired of toying with technology, try playing around with GEOS. Once you feel its power, you'll know that for anyone who still thinks Commodores are toys, the game's over.

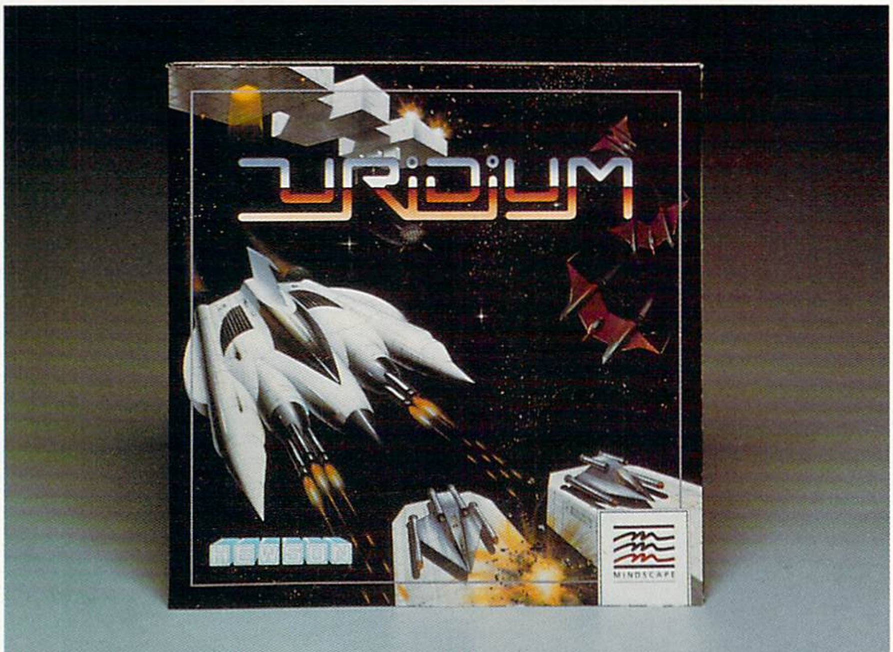
**Berkeley Softworks**

The brightest minds are working at Berkeley.

Reviewed by Gary V. Fields

# Uridium

**Computer:** Commodore 64
**Publisher:** Mindscape
3444 Dundee Road
Northbrook, IL 60062
**Medium:** Disk
**Price:** $29.95




Just when you think you have the game beat, an enemy fighter will incinerate you, or a homing mine will vaporize you.

*Uridium* is a lightning-fast trip into futuristic space war. As soon as you boot the game disk, you are transported into deep space to defend the universe against squadron upon squadron of enemy fighters and their 15 different Dreadnought mining ships. Each mining ship is robbing a planet of its mineral resources to supply the invading space race's fuel requirements. Your job is to battle your way to the runway located on each mothership. Then you must cause each to self-destruct by sabotaging the ship's fuel rods. Next you must escape, strafe any remaining surface targets before the mother ship vaporizes, and advance to the next level of competition.

The real challenge here is to get to the runway of the ship. Landing is no problem as long as the security space above the strip is free of enemy fighters. Escaping is more a chore than a challenge, but it is important to score as many points as possible here since a high score results in more Manta fighters being added to the successful pilot disposal.

The names of high scorers are added to the pilot's Hall Of Fame, but don't expect to join that exclusive club right away. Practice makes perfect, and you'll need a lot of it to score high here. The game includes a demo option for the curious and one or two players can play.

I've never met the game's creator, Andrew Braybrook, but it is apparent from this game that he is a fellow who enjoys his work and insists upon excellence. The graphics displayed in *Uridium* are among the best I've seen in 64 games. It's hard to think of the graphics in a space shoot-'em-up in terms of beauty, but that's the only way I can describe them. The enemy ships are realistic and detailed. Rather than flashy, gaudy colors for the motherships, Braybrook chose classic blacks and grays to give the illusion of a three-dimensional surface molded from tempered metal. The surface detail includes runways, parked space crafts, ports and bulkheads.

Most importantly, the game has the qualities necessary to make an arcade game succeed: speed, challenge, logic, great sound and visual effects, plus just the right frustration level to make you play just one more time. Finding the right mix of those elements isn't easy, but it makes all the difference.

Getting from level to level is no picnic, but it is possible. But just when you think you have the game beat, though, an enemy fighter will incinerate you, a homing mine will vaporize you, or you will self-destruct flying into the Dreadnought's three-dimensional superstructure.

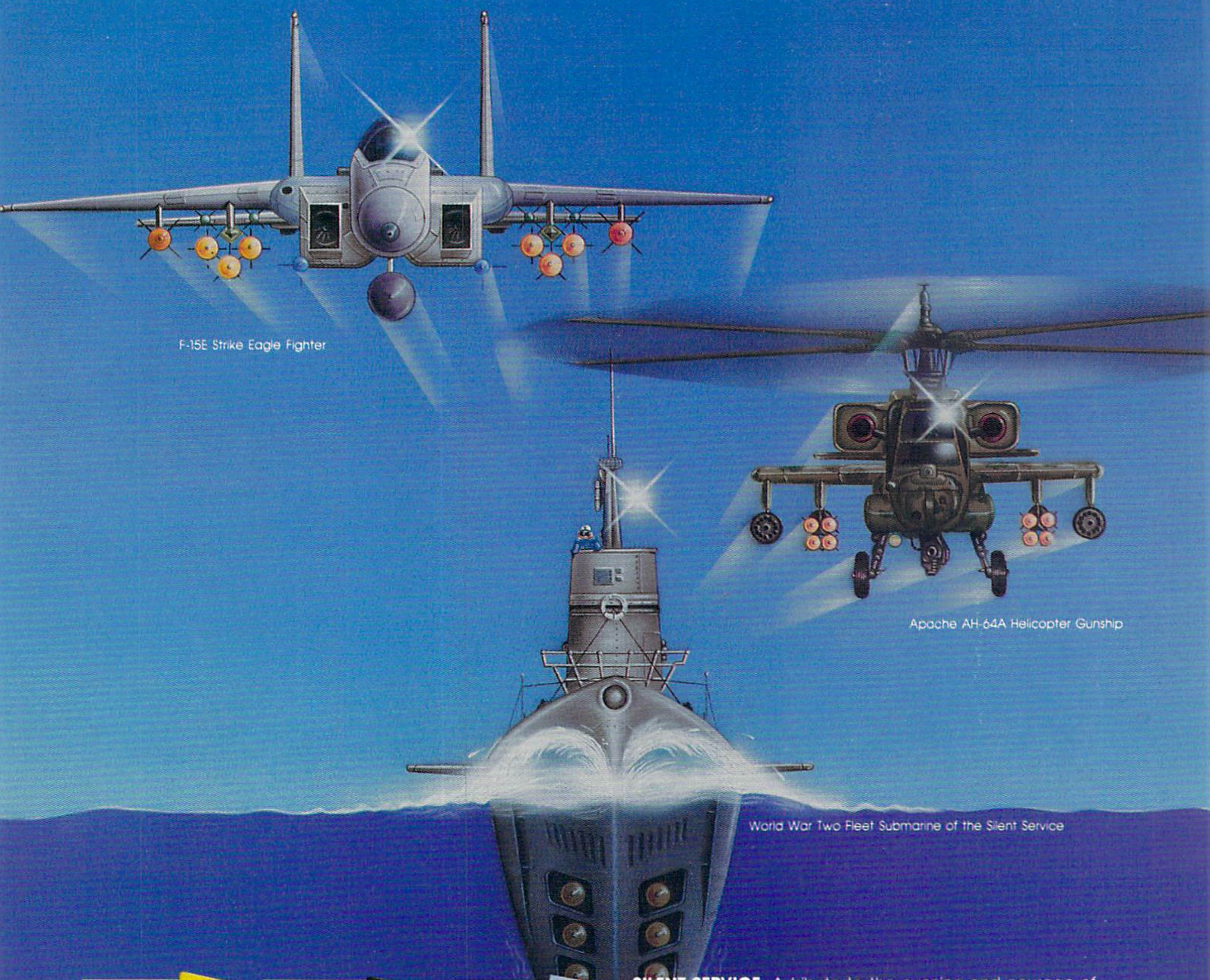
The game also passes the age barrier test—both my five-year-old son and I enjoy the challenge. The speed, action and sound effects keep his attention while the logic and challenge keep mine. Before his bedtime we like to sneak off into my office and boot up a game we both can enjoy, and *Uridium* is the current favorite. We turn off the lights and escape into the adventurous darkness of a space adventure.

If you are a collector of arcade games, you'll want to add this one to your library. It is very well done and addictive. The game's speed and graphics rival anything you are going to see in any arcade cavern. In fact, the game parallels a quarter arcade to a fault. Just as in a regular arcade game, there is no option to save a game in play (there are a total of 15 levels). There is no way to save that spot in the game so you can restart there if, or should I say when, you lose your last Manta fighter. When you lose your last fighter you must start over again at level one. This assures a never ending challenge since only the super pilots will get past level seven. (I'm still looking for level six.)

It's hard to judge whether *Uridium* is better than other arcades already on the market. If you want speed, this game is fast. A beginner will probably last under three minutes trying to battle his or her way to the first landing strip, but an experienced pilot could maneuver his Manta to level four in less time. To compete successfully here, it is paramount that your eye/hand coordination and memory for detail be top notch. You'll have to out-shoot and out-maneuver hundreds of enemy ships. You'll have to memorize the surface detail of every Dreadnought you encounter (a wrong turn always ends with your Manta spread like mayonnaise on the bulkhead of the mother ship). As is true in the classic arcades, each level of *Uridium* is more difficult than the next, but the completion of the lower levels subconsciously conditions you for the challenge ahead.

*Continued on pg. 115*

# Face to Face with Excitement!



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Available from your local retailer. If out of stock, contact MicroProse directly for further information on our full range of simulation software, pricing, availability, and to place Mastercard/Visa orders.

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Reviewed by Gary V. Fields

# Artworx Games

**Computer:** Commodore 64
**Publisher:** Artworx
1844 Penfield Road
Penfield, NY 14526
**Medium:** Disk
**Price:** $14.95 each

These five packages from Artworx may be priced like the bargain basement, but they are not basement-quality. The retail prices of these games are about half what we've become accustomed to spending for newly released software. The documentation of each is printed on the front flap of each program's compact packing. While little expense was wasted on documentation or packaging, the actual games don't suffer from this frugality.

*Police Cadet:* This game wasn't intended to simulate the mishaps of the misfits in the movie *Police Academy*, but after a round at the shooting gallery called Front Street Subway, you may feel just as foolish as the actors in that movie. The task in the first round of cadet training is to shoot or arrest anyone entering the subway carrying a gun. That's easier said than done since, except for the barrel of a pistol sticking out of their fisted hand, criminals look just like everyone else on the platform.

You must point your gun at the bad guys and if they fail to surrender, pull the trigger. It's important you do this as quickly as possible since the bad guys don't hesitate to discharge their pistols whenever and in the direction of whomever they please. The problem here is that everyone is walking. Sometimes innocent citizens will block your sights, sometimes the bad guys will disappear in a crowd or onto the subway train, and sometimes the criminal will throw up his hands just as you press the trigger. The police commissioner and the press frown upon a policeman gunning down unarmed people, regardless of whether they are criminals or not. The key then is to shoot straight and be sure of your target.

After you finish your training on the subway beat, you must complete semesters two, three and four to graduate. Each semester offers another dangerous police/criminal confrontation and each has five levels of difficulty. To become a police officer, you must finish each without shooting or arresting a single bystander. And, above all, don't go berserk and machine gun down the entire city just because advancement is so frustrating. By holding the trigger down you can do just that, but I'll guarantee your professor won't look kindly upon the action.



*Thai Boxing:* I'll try to resist the impulse to say things like "you'll get a kick out of this program." A more applicable cliche would be to say the game is a "kick in the head." The game is a three-dimensional arcade contest between two boxers using martial arts. The gloved boxers can not only use their fists to defeat an opponent, but their feet as well. I've tried several karate and boxing simulations costing twice this one, and to be honest, for pure fist to face action, *Thai Boxing* is as good as any.

The game shows two boxers centered in the screen and surrounded by a variety of oriental landscapes. The top lines of the screens display an energy bar showing how fresh each boxer is, a score devised by the number of hits each boxer lands, and two faces depicting the opponents. *Thai Boxing* has a strange side and it is displayed in these two faces. As a boxer receives blows to the head, the corresponding head will graphically display the damage—cuts will open around the eyes, blood will begin dripping from a broken nose, and bruised eyes will appear to swell and close. So, at the end of a punishing round, a fighter's face may resemble a pound of freshly ground beef more than an oriental male. I was a little concerned at this display of raw violence. My wife turned away, but my five year-old son and his next door buddy were fascinated and played until their thumbs blistered.

*Thai Boxing*'s action is fast, well designed and realistic. If you want to beat someone into a pulp, do it with this program. At least here, after every round the coach in each corner cleans and restores the boxer's face good as new.

*Highland Games:* Unless you live in the British Isles or in the southern mountains of the United States, you may have never heard of Highland Games. But here in North Carolina we celebrate our British ancestry each year in July when members of the Scottish clans gather on Grandfather's Mountain to compete in traditional games of strength and speed.

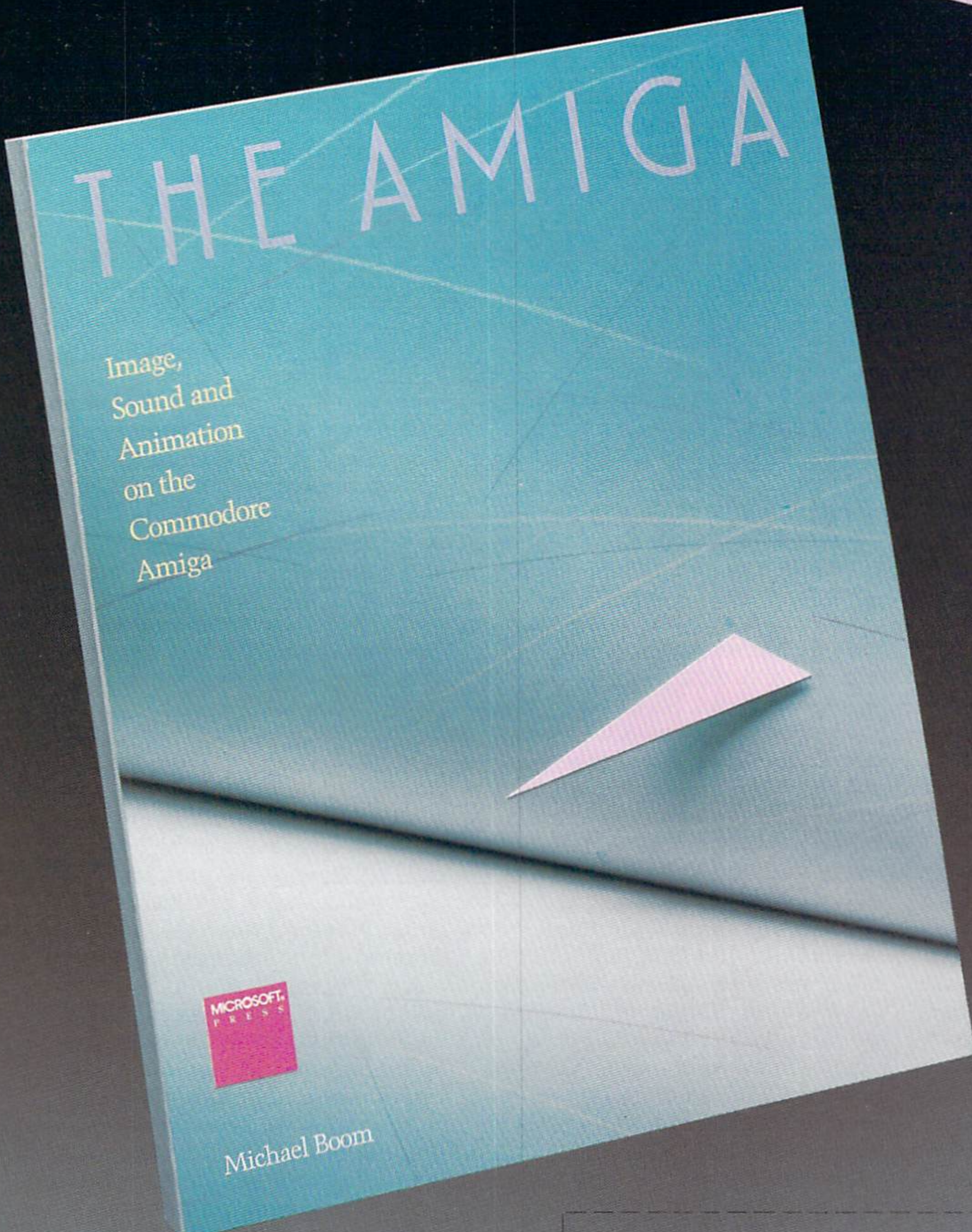
This game does a good job of simulating those gatherings. If you've played either Epyx's *Summer Games* or *Winter Games*, you have a pretty good idea of what to expect here. The graphics aren't quite the quality of the Epyx games, but the challenge in this collection is very similar. Each contestant must compete in five events: Hammer Throw, Long Jump, Caber Toss, Weight Toss, and Discus. If two players compete an additional event, Tug of War is possible. The graphics here are a little small, but still well done. Scottish bag-pipe music playing in the background gives atmosphere.

Most of you probably know what each event depicts with the exception of the Caber Toss, which is unique to the Celtic tribes. The caber is a post (like a short telephone pole) which the contestant tries to flip end over end for distance. I've seen the big guys try this trick and it makes my back hurt just watching. The only way you are ever going to get me on the working end of a caber is in this game. If you've got Scottish blood in your veins (I said Scottish blood, not Scotch in your blood), or are just looking for a different type of sports simulator, *Highland Games* is just for you. One or two players can compete and the game keeps track of high score.

*Beach Blanket Volleyball:* Creates a friendly game of volleyball in which either one player can compete against the computer or against another player. The rules and action here is exactly as it is in real play. The ball's speed and direction is determined by how hard you hit it and in which direction you aim. But, unlike competition level volleyball, only three players are used on each side of the net. As is true in the real game, players can serve, spike, return and win points by targeting the ball for unprotected areas. Timing, strategy and neck break scrambles are required to defeat a determined opponent. I thought the graphics here were less realistic than in most of the other Artworx games, but still acceptable. The screen display is three-dimensional and takes a little practice getting used to, but the

*Continued on pg. 109*

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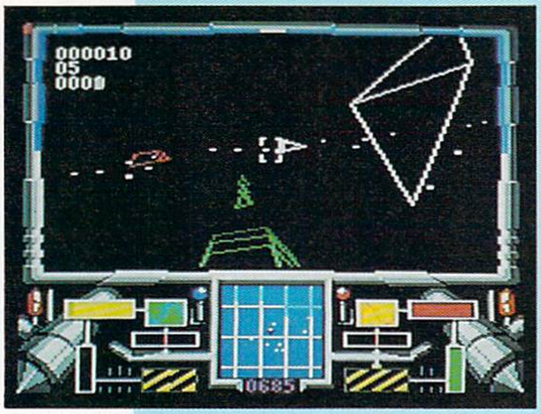
MICROSOFT PRESS

Reviewed by Scott A. May

# Starglider

**Computer:** Commodore 64
**Publisher:** Rainbird/Firebird
71 North Franklin Turnpike
Waldwick, NJ 07463
**Medium:** Disk
**Price:** $39.95

Unlike most interstellar invasion games, the relentless action in *Starglider* is fueled by a magnificent storyline.



Five minutes into this rambunctious British shoot-'em-up and you'll find yourself asking, "Where have I seen this game before?" Its influences are not hard to track down: the vector-graphic flight simulation from *Star Wars*, the 3D alien hardware from *Stellar 7*, and the epic fight for survival in *Elite*. If the game elements in *Starglider* seem vaguely familiar, it is not by accident. Far from a rip-off, however, the designers instead pay tribute to these classic games. Expertly fused with bold new ideas, *Starglider* emerges a true original in a class of its own.

Unlike most interstellar invasion games, the relentless action in *Starglider* is fueled by a magnificent storyline. Packaged with this game is a 64-page novella by James Follett that not only sets the mood, but is essential to victory. Hints and tips are cleverly hidden in the story, which unfolds to an exciting climax. Few games of this type incorporate off-screen text with such vitality.

The time is the distant future, in a remote corner of the universe. A hostile race of creatures from the planet Egron sought to expand their empire into the galaxy's last unconquered region. Only one planet stood in their way—Novenia—your home.

Peace-loving, yet technologically advanced, Novenia was no stranger to Egronian attacks. Government scientists had perfected a fleet of powerful computer-controlled sentinel ships to patrol the outlying fringes of the star system. Programmed to destroy anything that moved within sensor range, the sentinels effectively guarded all approaches to the planet. The Novenians trusted the sentinels to the point of abolishing all home-based military defenses. The ruthless disposition of the sentinels, combined with a rare natural occurrence, would prove the downfall of Novenia.

Novenia, it seems, was also the native home of an unusual species of migratory birds known as stargliders. During the return voyage of their ten-year intergalactic mating ritual, an entire flock of stargliders were wiped out by overzealous sentinels, mistaking the rare birds for an alien fleet. The sentinels were quickly modified to differentiate stargliders from other shapes and allow them to pass unharmed.

Egronian forces wasted no time to exploit this incident, building a fleet of 20 transport ships patterned in the exact shape of stargliders. Slipping past the unwary sentinels, the Egronian army descended upon Novenia. From the transport ships came a torrent of death and destruction. Following a rather one-sided battle, the planet surface was laid to waste. Black clouds from atomic fallout choked the atmosphere, resulting in total darkness. The Egrons finally ruled Novenia.

Your role in *Starglider* is that of a pilot stationed at an out-lying lunar research base. Your team was spared the holocaust, but are doomed without supplies. To survive, you must do the impossible—return to Novenia and single-handedly destroy the entire Egron army.

As the game begins, you have just reached the planet surface in your aging Novenian fighter, known as an AGAV (Airborne Ground Attack Vehicle). Outdated yet still very lethal, the AGAV features twin pulse laser cannons, responsive plasma-drive engines, force shields, and remote-control video-guided missiles. The instrument panel includes a local area scanner, energy and shield level indicators, altitude and velocity meters, laser cell status, compass, and bank level displays.

The AGAV is controlled through a clever blend of keyboard and joystick input that is very easy to master. As a flight simulation, *Starglider* sticks close to the basics. Its power stems from the ability to move in and around the on-screen images at blinding speed. The game's spatial environment is quite remarkable.

In an interesting turnaround, the Egrons now control the planet, casting you as the invader. Needless to say, your presence immediately attracts attention. Scattered throughout the planet are numerous Egronian units of every shape and deadly design. Battle tanks are the main land forces, firing powerful neutron missiles. Starglider Drones are animated bird-like ships that are nearly impossible to kill with laser fire. Bute Fighters—and its faster version, Lotus Starfighters—are air vehicles adept at dodging your attacks.

Juno Cannons are strange, towering machines that fire heat-seeking neutron missiles. Pyramid Launchers appear innocuous until they let loose with deadly homing missiles. Pyramid and Diamond Mines are like floating magnets of destruction. Tri-Launchers fire in bursts of three homing missiles. Walkers and Stompers are frightening adversaries, completely impervious to laser fire.

Finally, there is StarGlider One, flown by the Egron Commander. Large, fast and powerful, your confrontation with StarGlider One signals the final stages of the game. Only expert pilots and crack shots will live to fight this ultimate battle.

The planet surface is immense, divided into 10,000 sectors on a 100 x 100-sector matrix. The pitch-black sky is broken

*Continued on pg. 109*

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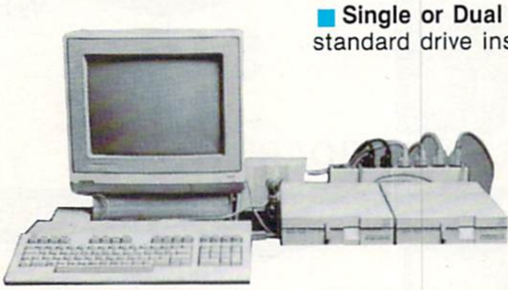
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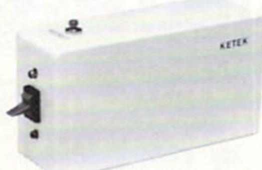
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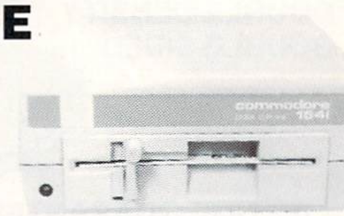
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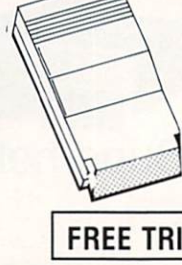
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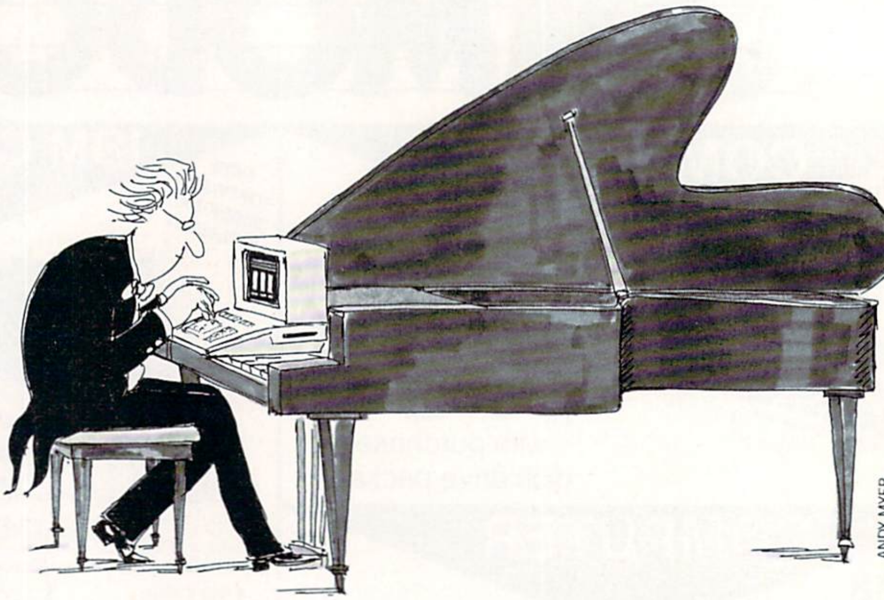
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Reviewed by John J. Kottler

# Sonix




**Computer:** Amiga
**Publisher:** Aegis Development
2210 Wilshire Blvd.
Santa Monica, CA 90403
**Medium:** Disk
**Price:** Not available

Anyone who has seen Commodore's Amiga has often associated this fabulous machine with its graphics, high-speed power and multitasking abilities. But one feature that countless people seem to overlook is the Amiga's sound. No other computer on the market can produce sounds quite like the Amiga. The Amiga is capable of producing nine octaves of a wide variety of digitized sounds.

Many of the games written for the Amiga take full advantage of its remarkable sound synthesis. But how about music? *Sonix* from Aegis is the newest entry into the Amiga music program category. *Sonix* is quite an astounding program, to say the least. After watching it grow up out of nothing, I believe it is by far one of the best music programs to demonstrate the Amiga's sound.

When first introduced to *Sonix,* you may find it an ordinary music program. But after working with it for several months, I can assure you that this is a complex sound-producing program. The first screen you use is the Score screen, which is in the drop-down menus. This is the screen where you perform all of your editing and compose music. The Keyboard screen allows you to customize the keyboard of your computer in order to use it as a piano keyboard. The third screen, the Instruments screen, is the section of the program where you can design your own custom sound effects, similar to programming a synthesizer.

The Score screen is used for entering, editing, saving, loading and printing your musical compositions. Across the bottom are sliders that control the volume and tempo of the music, along with a transposer for moving the score up and down notes, and a tuner, just in case your ear feels that the song is a tad flat. Next to these sliders are the playback controls, better known as PLAY, STOP and REPEAT. PLAY and STOP are quite obvious in their functions, and as for the REPEAT, it merely repeats the song continually looping the end of the song back to the beginning.

To the right of these playback controls are the tracks labeled 1, 2, 3 and 4. You must enter each track one at a time, and each must be set either to enter and play loud, play soft, or be turned off. There are also two buttons beneath the Bass Clef, marked with the Roman numerals I and II. Clicking the II will allow you to enter an additional four tracks numbered 5 through 8 for MIDI tracks.

Across the top of the scroll bar is a list of musical notes and rests along with a flat sign, a sharp sign and a natural sign. When entering a composition, the user can direct the mouse to a desired note, click the button, and carry that note to its proper place on the staff. It's that simple! Plus, the ends of measures will automatically appear according to the time measure you have entered and ties will be stretched across the bar lines.

The pencil bottom is used as the eraser and the bracket is an advanced editor control field. Edit features include copy and paste, halfstep down and up, cut, clear, play, repeat, and octave up and down. Of course, you may also select the time and key signatures of your composition and even use the Mix Down option to balance the volumes of each track during playback.

But the most exciting feature of *Sonix* is the Instrument icon. Sure, the instrument icon merely allows the user to select instruments to use in the song, but what makes it exciting is the fact that digitized sounds can be used in your songs! Instruments on the *Sonix* data disk include distorted guitar, snare drum, bass drum, cymbal, high hat and tom drum—all of which are fully digitized sounds of the real things! Using these instruments and ones that you create in the Instruments screen, you can write some extremely impressive music.

Remembering that the Amiga is a full scale synthesizer, a keyboard mode was included so you can tap away on the computer keys to play a tune, although you may also tap away on keys on your MIDI keyboard as well. The Keyboard option found in the drop-down menus allows you to redefine the keyboard which is accessible in all three modes.

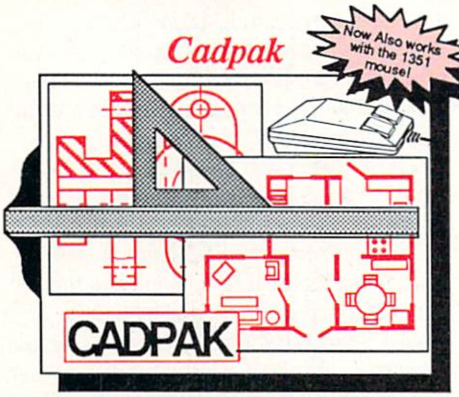
Synthesizers are among the most high-tech instruments available. Used by many music groups, they are capable of producing an extremely wide variety of sounds. And the Amiga personal computer has a synthesizer built into it! Several companies are producing digital sampling interfaces for the Amiga that will allow the user to record and save a sound, then integrate it into a custom program or a song. Imagine recording drum solos from a popular song and using them in your own computer music! Or listening to thunderstorms in any of nine octaves!

*Sonix* does not include a digital sampling machine, but can load sounds you make using a sampler such as the Soundscape Sound Sampler by Mimetics. However, if you are familiar with synthesizers, you can create your own sounds with the Instruments screen. This screen allows you to choose a preset waveform; draw your own waveform; set the frequency oscillators; select different amounts of

*Continued on pg. 114*

# HOT SELLERS

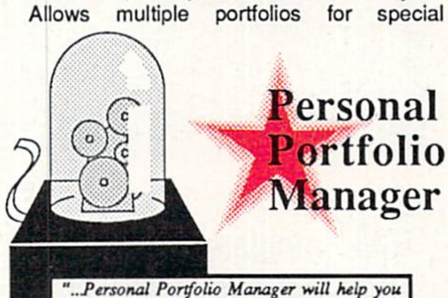
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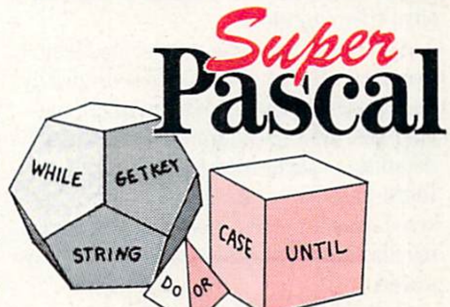

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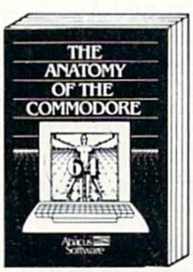
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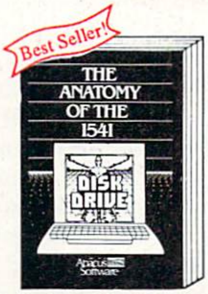
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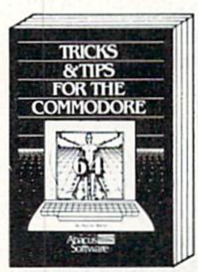

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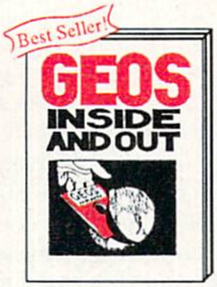

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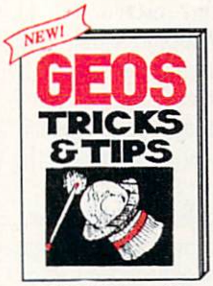

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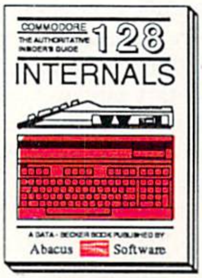

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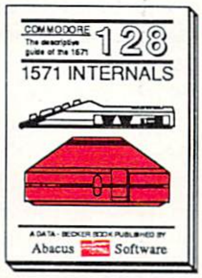

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Reviewed by Donald Maxwell

# SWL

**Computer:** Commodore 64
**Publisher:** Micrology Corporation
18713 Mooney Drive
Gaithersburg, MD 20879
**Medium:** Cartridge
**Price:** $64

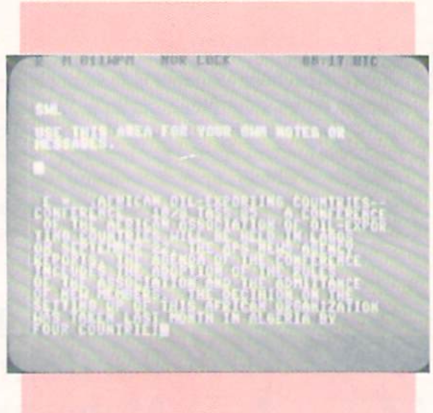
If you've been wondering about those mysterious "dit-dah" and "doodlie-doodlie" signals on your shortwave receiver, then Microlog's *SWL* cartridge might be just the thing to plug into your 64. *SWL* (the letters stand for Short Wave Listener) translates Morse code and radio teletype signals into plain language and prints them on your monitor or television. It can also send them to your printer or save them on tape.

*SWL* contains some very sophisticated decoding algorithms that were originally developed for powerful commercial, marine and military equipment. Because the decoding is performed mainly by the ROM-based program instead of by expensive hardware, *SWL* not only works well, it's also neatly packaged and moderately priced.

However, in order to use it you must have a shortwave receiver with a BFO. A BFO produces a signal that makes radio teletype and Morse code signals audible and adjusts their pitch so that *SWL* can decode them. Almost any receiver will do, as long as there's a BFO. You should also have an external long wire antenna with a shielded lead-in to reduce the interference from radio frequency signals generated by the computer, the printer, and the monitor or television.

Connections are simple. The *SWL* cartridge plugs into the computer's cartridge port, and a cable (supplied) connects your receiver's audio output to the *SWL* cartridge. The cartridge also has jacks for a Morse code key and a headset or external speaker.

The *SWL* screen comes up with a status line at the very top and a two-part split-screen area beneath. The top portion of the split-screen, eight lines high, is used to display anything you type in on the keyboard. The bottom 13 lines are for incoming text. (These areas could be called windows, except that there are no visible borders around them.) There are two cursors, one for each part of the split-screen display, and both portions of the split-



SWL translates Morse code and radio teletype signals into plain language.

screen can be active simultaneously. The upper portion can be turned off or on at will with a keyboard CTRL code, allowing you to see up to 22 lines of incoming text.

The first use of *SWL* should be to play the demonstration tape that comes with it. This is a recording of the audio portion of a radio teletype message from Microlog to you. You plug the connecting cable into a standard cassette player instead of into your receiver, and when you play the tape, *SWL* decodes the "doodlie-doodlie" sounds and prints the message on the screen. This lets you know that *SWL* is working properly. And it gives you a clear sample of what radio teletype signals—RTTY—sound like, so that you can tune them in more easily on your receiver.

The *SWL* instruction book directs you to try receiving RTTY next. However, I found that Morse code was much easier to tune in and copy successfully because it requires the fewest manual adjustments. For the most part, Morse decoding is done automatically by *SWL*, especially when the signal is reasonably strong and free from static. You find a Morse signal on the receiver and adjust the BFO until *SWL* begins printing characters on the screen. A red dot appears in the status line when the signal is tuned correctly. Also, *SWL* echoes the "dits" and "dahs" with tones of its own, sent through your monitor or television, and you can fine-tune the BFO until the received pitch agrees with that produced by *SWL*.

*SWL* can receive Morse code speeds up to 99 words per minute. It compensates nicely for individual speed variations in hand-sent code, and in extreme cases you can lock the speed manually, although I've found this necessary only when trying to copy very faint, noisy signals.

RTTY reception is somewhat more tricky because there are so many different types and speeds of RTTY transmission that require manual adjustment. Tuning is everything in RTTY. You have to tune in the signal properly and adjust the BFO until the resultant two-tone audio signals are the right pitch. This is indicated when the red tuning dot in the status line stays on steadily. Right beside the dot, the mark and space tones are represented by the horizontal and vertical lines, respectively, of a cross. The tone generator will be synchronized with the mark signals.

You will also probably have to experiment with the wide/narrow frequency shift switch, which is located on the *SWL* cartridge. Then you have to determine whether the signal is Baudot or ASCII, and you have to select the correct speed with a keyboard CTRL-code. You may also have to experiment with the normal/inverse demodulation selection and the upshift/shift-on-space selection. There are several other keyboard selections that you may also need to experiment with in order to obtain a clear copy.

But when you finally get everything right—well, it's really exciting. I was beginning to feel pretty frustrated when all of a sudden I began recognizing words on the screen. No matter that they were in French. I could tell that it was a news story about a conference in sub-Saharan Africa. I was so excited that I woke up my wife and made her come look. She grumbled something that I'd rather not repeat here and stumbled back to bed. But I was still up at dawn, with pages of decoded RTTY messages spilled all over the floor near the printer.

With a little perseverence, you can copy such exotic RTTY transmissions as foreign and domestic news services (many of which transmit in English), radio amateurs, ships at sea, military services —the list is almost unlimited. Also, I was surprised to discover a lot of maritime traffic is conducted in Morse code.

However, you will almost certainly want some help in locating RTTY transmissions, because most stations transmit only at certain hours and change their fre-

*Continued on pg. 36*

*Continued from pg. 34*

quencies several times a day to compensate for the daily changes in the ionosphere. Fortunately, there are a number of publications devoted entirely to logging RTTY transmissions by time, frequency and signal parameters. Also, several popular periodicals include regular columns for RTTY enthusiasts.

Except for the wide/narrow frequency shift switch on the *SWL* cartridge, all commands are entered from the computer keyboard in conjunction with the CTRL, Commodore logo and SHIFT keys. Few are mnemonic, however, and there are no built-in help screens, so you just have to look them up in the manual.

The 32-page manual contains everything you need to know. There is an introduction to Morse and RTTY reception. There are chapters covering the mechanical connections, the use of *SWL* for RTTY and Morse, and use with a printer and a datasette tape recorder with BASIC. And there is a list of the various keyboard commands.

Unfortunately, however, you may have to do some digging to find what you need to know because the manual contains neither an index nor a table of contents. Similarly, the list of keyboard commands in the back of the manual is organized alphabetically by command, instead of being indexed by function, making it a chore to find the particular command you need. This lack of indexes frustrated me so much that I finally copied out the entire list of keyboard commands—all 68 of them—and re-sorted them according to function.

All four screen colors can be changed from the keyboard. The default colors are dark blue status line; white cursor in the text area; yellow in the receive area; light blue background. There is a 28K text buffer, half of which can be used to store incoming messages.

Eight 512-character programmable memories are available for storing short messages as macros. There are also two 11-character selective print memories and two 64-character ID memories. There are also a few built-in messages, including "RYRYRY...," "THE QUICK BROWN FOX...," and "WRU" ("Who are you?").

*SWL* also doubles as a Morse code practice oscillator. You can plug in a hand key and practice sending "dits" and "dahs." Furthermore, there's an unexpected bonus to receiving Morse code with *SWL*—you get better at copying Morse code yourself, almost without effort. This is because you hear the incoming code signal slightly before *SWL* decodes it and prints it on the screen. So you unconsciously anticipate the decoding process and then receive instant feedback on your own decoding.

*SWL* is intended to be used solely for reception. As you may have noticed, however, some of its features suggest other uses— notably for transmission. The manual even describes certain commands as used in the transmit program only. These commands appear to be hold-overs from Micrologʼs more sophisticated *AIR-1* program, from which *SWL* appears to be derived. This might lead you to wonder whether *SWL* could be used to drive a transmitter. I haven't tried it. But the commands exist in the ROM, and *SWL* will send a single-tone audio Morse, Baudot or ASCII signal of anything you enter into the text buffer, so I suspect that in a pinch it could be used.

The *SWL* cartridge is well made, with gold-plated contacts, good quality components, and a screw-together case. Inside, there are two IC's, one EPROM, three mini-jacks, a slide switch, a trimmer capacitor, and some 21 other resistors, capacitors and semi-conductors.

That there is no disk access bothered me at first. But this turned out not to be terribly inconvenient after all because my natural inclination is to print out on paper anything I might want to save. So far, I've never felt the need to save anything on tape. Anyway, for $15 Microlog sells a program that enables *SWL* to use the disk drive.

One minor quirk is that it is impossible to switch from the 300-baud ASCII setting to Baudot or Morse without first resetting the speed to 110 baud. Otherwise, if *SWL* has a fault, it's that there are almost too many features. This, coupled with the lack of indexes in the manual, makes learning to use it somewhat exasperating. Once you know your way around, however, it turns out to be very powerful and reliable. I know of nothing else on the market today that compares with it in features and price.

## Morse and Baudot Encoding Systems

In Morse code, you hear short and long tones (dots and dashes) and short, medium and long spaces between the tones. The short spaces come within a character, the medium spaces between characters, and the long spaces between words. Also, the length of each character (the number of tones and spaces within it) varies enormously—from a single, brief dot to as many as five or six dashes. Decoding Morse, therefore, involves measuring the length of each tone and space to tell when one character ends and the next one begins and to tell where one word ends and the next begins. This is all very irregular.

RTTY signals, on the other hand, use audio frequency shift keying, which produces two different tones, or pitches, one indicating the space and the other, the mark. This two-tone system makes it possible for all characters to be the same length, but it also makes tuning quite a bit more critical because the decoding device must be able to tell which tone is which in order to decode a message properly. The frequency difference between the tones is called shift. Most amateur RTTY operators use a narrow shift of 170 Hz, and most commercial stations use a wide shift of either 425 Hz or 850 Hz.

In addition to differences in shift, there are several conventional RTTY encoding systems, in which each character is represented by a certain set number of spaces and marks. A space is analogous to a binary 0 and a mark to a binary 1, and can be thought of as bit. Many amateur radio operators use ASCII encoding, in which each character is represented by eight bits. But the most common (and earliest) RTTY system, Baudot, uses five binary bits to represent one character. Another less common RTTY encoding system called TOR (which *SWL* doesn't seem to recognize) uses seven bits per character. And, of course, there are also special encoding systems that are intended to remain secret.

## Recommended Reading

*World Press Services Frequency List and Manual*
*Guide to Radioteletype Stations*
*RTTY Today*
*Clandestine Confidential*
Available from Universal Electronics, Inc., 4555 Groves Road Suite 13, Columbus, OH 43232.

Magazines that regularly prit RTTY columns:
*Popular Communications*
QSL (W1AW schedule includes daily RTTY and Morse bulletins)
*73*

Reviewed by Mark Cotone

# Financial Time Machine

**Computer:** Commodore 64
**Publisher:** Insight
2708 Arlington Avenue
Highland Park, IL 60035
**Medium:** Disk
**Price:** $34.95

Step back into the past to measure your financial savvy against the most challenging market factors in the history of our nation.




ANDY MYER

As if investors in today's stock market didn't have enough obstacles bending them toward bankruptcy, Insight's new *Financial Time Machine* would like to add world history as another nuisance factor to be figured into the speculator's money making equation. By charting and recreating every social, economic and political stage of the investment scene from 1930 to 1984, this game offers players the opportunity to step back into the past to measure their financial savvy against some of the most remarkable and challenging market factors in the history of our nation. Through 50 years of peace, war, inflation, depression, recession and recovery, it's time to put your market know-how on the line. History is about to repeat itself, and anyone with an adventurous sense of investing is invited along for the ride.

The structure of the *Financial Time Machine* is designed to replicate the real stock exchange as closely as possible. Every type of investment opportunity is here at your disposal, with stocks, bonds, put and call options, gold, real estate, and stop-loss limit orders all available for the asking. To keep the game playable, the actual size of the simulated market has been scaled down, with only 27 companies making the transition to the home screen.

But it's reduction without restriction, for the designers have picked their typifying companies very carefully, providing a broad cross-section of securities that offers at least one company in each significant industry group. This limited market design, though somewhat oversimplified for the experienced buyer, allows the relationship between world events and stock prices to be observed without crowding the game with parallel companies.

In the true-to-life historical world that engulfs the *Financial Time Machine* market, society plugs along deliberately, providing all of the catalytic elements needed to trigger the volatile investment world to life. A half century's worth of disasters, developments, disappointments and dreams slowly unfold into a limitless array of political and economic climates.

The contest's principle game screen epitomizes the investment world's environment of ordered chaos. Constantly changing facts and figures cover a playfield that is both organized and functional. The top half of the screen sets the game's stage, with a pair of colored bands highlighting the market's two most important elements. First is a scrolling electronic news wire, which is used to display all of the relevant news and information from around the globe. Above that sits the familiar ticker tape readout, a non-stop financial scoreboard that keeps you updated on the concurrent progress of each issue. These two strips provide the ever changing foundation for your investment ploys.

On the remaining bottom half of the screen sits your own personal portfolio, where a complete list of all of your holdings is displayed. The name of each security owned, along with its current price per share and market value is clearly outlined for easy reference. In addition, an updated tally of your loans, cash on hand, and overall net worth is also furnished.

The usual plain and patient stock market success equation—buy low and sell high—is your ticket to riches in this game as well. Unfortunately, as anyone who has ever dabbled in the market can attest, the formula is a lot easier to understand than it is to execute. To help you calculate your risks, Insight supplies all the informational ammunition, providing pages of corporate histories and secrets backed by a host of on-screen charts and graphs. But I wouldn't get too cozy under these blankets of knowledge. For this program not only requires that you think clearly, it also expects you to think quickly.

As is standard practice in the financial world, each year has been broken into equal quarters. For gaming purposes, these quarters have been subdivided into eight separate sections. In each of these smaller divisions a new news item scrolls across the screen, and all the prices of the individual securities are updated and displayed. Now it would be nice to have the luxury of sitting back and taking some time to analyze all of these factors before making any buying decisions. But Insight not only wants to accurately recreate the market structure, they're also interested in simulating the fast pace of the market environment as well—a place where hundreds of thousands of dollars can be won or lost depending upon one's ability to quickly spot a signal or trend.

With the *Financial Time Machine*, time waits for no one. During each subdivision, a news item will only pass across the screen twice. After that, another item appears and the action continues without pause. In about a 50-second span, an important occurrence can be here and gone, and if you aren't keen enough to notice and take action, you might miss the boat altogether. This uninterrupted flow continues until the end of each quarter, where players are given a privileged breather when the brokers and IRS representatives stop over to tie up any financial loose ends.

Now, Insight realizes that players of different experience levels will be approaching this contest, so their relentless pacing can be modified. Newcomers can pause the action at the end of each week if they wish, allowing themselves ample time to absorb the significance of each event. And believe it or not, for the lightning fast, speed-reading investors, the game's pace can actually be increased by the jump mode, a function that lets you zip right through any preselected number of weeks to see how well your long term investment strategies are panning out.

*Continued on pg. 119*

Reviewed by Bob Lindstrom

# B.E.S.T. Business Management System

**Computer:** Amiga
**Publisher:** Business Electronics Software & Technology (B.E.S.T.) P.O. Box 230519 Tigard, OR 97224
**Medium:** Disk
**Price:** $395.00

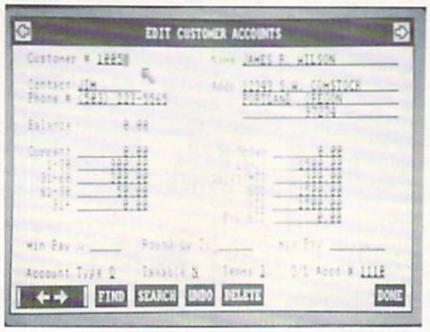
Imagine that you have a small business and you've hired three round-the-clock accountants to do the bookkeeping. One is at his desk from 9 AM to 5 PM to manage accounts receivable. Another arrives from 5 PM to 1 AM to do accounts payable. Finally, the last accountant labors from 1 AM to 9 AM on the general ledger.

Everyone is working on the same project, but no one is in the office at the same time.

If you want to ask one accountant a question, you have to arrive at the office when he's on duty. Just hope that you don't have an accounts receivable question as well as a general ledger question. You'll have to wait until accountant one is finished and accountant three starts his shift.

The same thing is often true of integrated accounting software. The modules for Accounts Receivable, Accounts Payable and General Ledger modules are separate, independent programs. Those modules all share a data disk, but they're never in the computer at the same time. The user has to endure endless disk swapping and at no time does he have access to all of the program's capabilities.

The *B.E.S.T. Business Management System* for the Amiga computer is an attempt to avoid this divided effort. Billed as "a truly integrated accounting system," all of its modules available at once: Accounts Payable, Accounts Receivable, General Ledger, Inventory, Services, and Business Functions (purchasing, receiving, check writing). With the speed of the Amiga and the integration of the program on your side, it is simple to leap from Invoicing to General Ledger Transactions to print an Accounts Payable




statement and immediately write checks to cover expenses.

Integration in this program is much more than having all the puzzle pieces on the same table, so to speak. This program redefines the functionality of accounting software by integrating the accounting process itself... automatically. For instance, issue and post a purchase order for five widgets in the Business Functions section. Immediately the program updates Inventory to show that you have five widgets on order. Write a check payable to Harvey's Army Surplus Potato Chips and the program credits Harvey's vendor file in Accounts Payable.

Fortunately, this is fast. There are few, if any, long waits while the program and the Amiga do their thing. And unlike other accounting systems that pick up speed by making program and data memory-resident, this program saves data to disk during the session. You cannot lose your work due to a power outage or because you forgot to save data before turning off the computer. With each new entry, you are prompted to securely save the new information on disk.

With this system at work, the small businessman is freed from the muddle of credits and debits, left or right columns, double entries, and receivables. Accounting is reduced mainly to simple data entry, which lets Mr. and Ms. Businessperson concentrate on what they know best—buying and selling. Let the Amiga worry about manipulating the dollars and account numbers.

It's a great concept, but how well does it work? The answer is brilliantly.

The *B.E.S.T. Business Management System* is a very affordable system, particularly when combined with low-priced Amiga 500. The program will operate with a minimum configuration of 512K RAM Amiga, printer and one disk drive. Add an external disk drive and you'll dramatically increase both the efficiency and the capacity of the program.

Because the program allocates only the amount of disk data space that it actually needs and never uses more than 512K of RAM, it defines system capacity in terms of disk storage. The maximum capacity would occupy 8.5 megabytes of storage and encompass 3,000 inventory items, 1,000 services, 500 General Ledger accounts, 25,000 transactions, 2,000 Accounts Receivable, 1,000 Accounts Payable and 1,000 Invoices/Purchase Orders/Checks.

Most small businesses will need only an external 880K disk drive, however. Later, they easily can move to a hard disk for an increase in storage capacity. For larger businesses, there is a higher priced version of the program (available directly from B.E.S.T.) that requires more RAM and virtually eliminates the capacity limits of the system.

To begin, users will set up a complete chart of accounts from standard cash accounts and sales to employee insurance and advertising costs. As with any accounting system, devising a workable chart of accounts will be the most important, the most time-consuming, and the most difficult aspect of using the system.

It would have been nice if B.E.S.T. had included several pre-designed charts for various home and small business situations. The documentation has only one sample chart made up for a video store. However, according to a B.E.S.T. spokesperson, dealers have access to several data disk templates covering a variety of businesses. The templates are ready to use and include a chart of accounts and complete integration.

With the chart of accounts finalized, the program is ready to accept your business data in complete detail. The many data entry screens in the modules store more information than it is possible to list in a review. Throughout the whole program, it requests financial information in great detail.

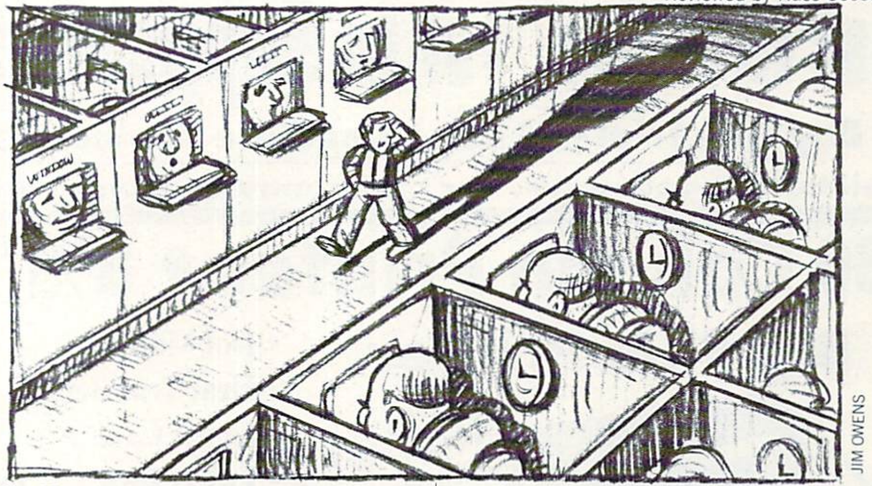
As a single example, look at the customer accounts in Accounts Receivable. This data entry screen includes spaces for the customer number; name, address, phone, and name of contact person; a listing of the current balance outstanding and complete account aging (1-30 days, 31-60 days, 61-90 days, and over 90 days); cash amount on order; credit limit;

*Continued on pg. 116*

Reviewed by Russ Ceccola

# Bureaucracy

**Computer:** Commodore 128
**Publisher:** Infocom
125 Cambridge Park Drive
Cambridge, MA 02140
**Medium:** Disk
**Price:** $34.95




Ever have one of those days when everything goes wrong? Perhaps you receive a bill for something you've paid for long ago. Or maybe you get a speeding ticket for going 36 mph in a 35 mph zone. Better yet, suppose you finally get to work only to find out that you have to undergo mandatory drug testing at 10 AM or lose your job. In all these cases, you have to deal with the forces that be—the bureaucracy that designs these rules to make your life harder.

*Bureaucracy* from Infocom pokes fun at all of the joys of inane bureaucratic processes. Designed by Douglas Adams, author of the popular *Hitchhiker's Guide* series, *Bureaucracy* sends the player on a nightmarish quest for sanity in a huge bureaucratic blunder. W.E. B. "Fred" Morgan was brought out of an early retirement to work with Adams on his second venture into interactive fiction.

You begin the game in your new house that you just bought after starting a new job at The Happitec Corporation. Their motto is "we'll bring a smile to your computer." The problem is that smiling is the action lowest on your list of priorities.

You're supposed to travel to Paris for a training seminar this afternoon. But the bank doesn't acknowledge your change-of-address form and the money order that Happitec mailed to you for expenses wound up getting lost in the mail. Also, your new credit card, a new change-of-address form, and checkbook were mailed to your old address and the new owner of your old house returned them to the old branch of your bank and the bank doesn't have your new address.

This shouldn't be too much for you to handle. The plane to Paris leaves in seven hours. You think that leaves plenty of time for straightening out the mess, but a llama, one-winged bird, Rambo clone, and strange man who cuts up mail for the stamps never entered into the plans for the day.

In *Bureaucracy*, you simply have to get the Happitec check, catch a cab to the airport, and enjoy a two-week training program in beautiful Paris. Although the challenge is great, the humorous style in which the game is written and the strong degree of personalization of the game's atmosphere to the player only tend to confirm my commitment to the excellence of this new text adventure.

The inspiration of Adams for *Bureaucracy* came from his attempt to move from one apartment to another in London without a hitch. When he tried to use a credit card, he was told that it was invalid. His bank had invalidated it and sent a new one to his old address, for they had also refused his change-of-address form. For weeks, Adams tried to correct the blunder. Finally, he succeeded—only to get an apology sent to his old address.

Adams' brand of humor has been evident in many places, from his own books and radio serial to Monty Python's Flying Circus and Dr. Who. Now, for the second time, he has brought his anecdotes to the computer gaming world.

*Bureaucracy* was designed for the 80-column world and works well on the 128. The reason for its adaptation to the 80-column screens and computers with large memory capacity is two-fold: *Bureaucracy* adds a unique element to text adventures that can only be attempted on large-memory micros.

The forms that I referred to are Adams' way of poking fun at all of the ridiculous papers that the bureaucracy would have us fill out. At the very beginning of the game, a warning appears on the screen that tells of the necessity to have a license to operate the software, after which an application form pops up on the screen.

You fill out this form with personal information that is made use of in the game. One of the entries is Prev. Girl/Boy Friend. When I typed in a name, the monitor beeped at me and "NOTE: Now a famous porno star" appeared at the top of the screen. This light-hearted approach to the game on Adams' part is what makes *Bureaucracy* a success. I could give countless examples.

The address that you enter on the initial form is where you start the game. The town on the form is the town in which you look for your check. This personalization makes *Bureaucracy* easier to play. More forms are used throughout the game and this method is also used to depict the computer screen in your house.

As well as having a score with a goal of 21 points, Adams included a blood pressure indicator at the top of the screen. For each annoying circumstance you encounter, your blood pressure rises. If it goes too high, you die and the game is over. By performing simple, non-annoying tasks, the numbers drop to the normal level of 120/80.

Don't let all of the humor elements of the game deceive you into thinking that the quest for freedom from foul-ups is easy—it's not. You may think that the parser will give you information easily, but it sometimes deliberately makes a fool of you. When I typed in EXAMINE KEYBOARD ON THE COMPUTER, the game responded with "It's just a keyboard. What did you expect? Dancing girls?" This is what you're up against.

Text adventures are well-received in the gaming world because of their ability to allow the gamer to form images in his head of what he thinks is happening. You aren't forced to have to accept a picture as the only possibility. The imagination can run free. *Bureaucracy* lives up to these standards and stretches your brain power to the limits with the weird situations that happen. How else would a llama farm be two doors away from your house?

*Continued on pg. 112*

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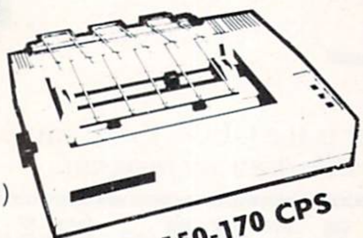
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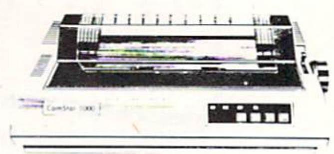
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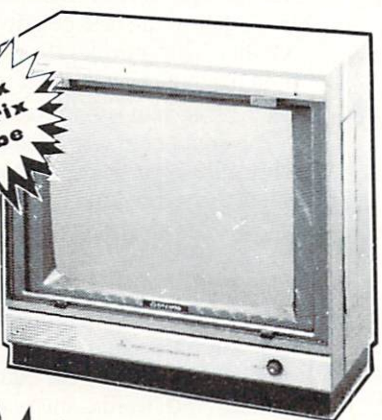
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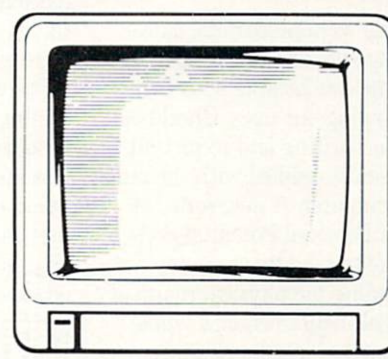
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Reviewed by Mark Cotone

# Personal Potential Series

**Computer:** Commodore 64
**Publisher:** Personal Potential Software
334 Parkvale
Grand Prairie, TX 75051
**Medium:** Disk
**Price:** $39.99

With all the word processors, databases and spreadsheets around, we've all become comfortable with the computer managing our lives. Checkbook balancing, letter writing and records filing have all been simplified with the aid of our trusty computer. A new series of programs from Personal Potential Software would like to take this one step further—transcending the physical realm of computerized self-help to enter a whole new world of psychological assistance.

Leaving the facilitation of our household tasks to others, Personal Potential Software has made our everyday personal problems their main concern. Dealing with every individual weakness from overeating to underachieving, their unique software series is here to help us break down our mental obstacles—those unseen yet formidable walls which often prohibit us from realizing our true potential.

Personal Potential Software attempts to carry out this personality renovation by changing negative attitudes and reduce undesirable behavior through a process called Enhanced Stimulus Impact (ESI). In their words, the ESI program is "a complex matrix of computer-generated stimuli patterns superimposed with positive and goal-oriented phrases" which are "transmitted visually...in a distraction free environment." It's a lot simpler than it sounds. What this package does is to first create an engaging atmosphere of soothing sights and sounds. This relaxes the user, allowing him to then focus his full attention on groups of words being presented and repeated over and over again. This type of uninterrupted, repetitious exposure to a thought or idea tends to help a subject more readily retain its intended message. Anyone who has ever caught themselves whistling an advertising jingle knows how successful this method can be.

It is Personal Potential Software's contention that a user concentrating on phrases supportive of his personal goals will soon incorporate these positive suggestions into his subconscious thoughts, providing the mental motivation needed to build a success-oriented mindset.

To help create an atmosphere conducive to concentration, the program relies on a couple of basic audio/visual effects. First, all lights are shut and curtains closed to darken the room. This allows the user to fix his attention on the screen. If a cassette player is available, a packaged musical tape is then inserted to provide a soothing instrumental backdrop to the process. Personal Potential Software calls this audio enhancement optional, but I've found it to be essential since it also doubles as a buffer to any unwanted noises. The use of headphones is also recommended to heighten the effect.

> If it is true that each of us holds within ourselves the power to achieve whatever we dare to dream, these programs may be the key.

When the visual ESI process begins, the screen comes alive with colorful rhythmic strobes. Hues and shapes change in timed beats, producing wave-like screen patterns that draw and hold the viewer's attention. This pulsing stimuli effectively places the receptive user in a state of reduced resistance where he will be more open to suggestions. While these mesmerizing formations continue, certain goal-oriented phrases are flashed on and off the screen; their content aimed at providing the user with positive support.

As of this review, Personal Potential Software has made available ten different entries. For the health conscious, there's programs for exercise motivation, weight loss, and even one to help you kick the smoking habit. For those looking to improve career foundations, there's a success motivator, a procrastination eliminator, a sales motivator, and a prosperity awareness builder. And the final trio, aimed at helping one deal with social pressures, includes a positive mental attitude amplifier, a self esteem and confidence builder, and a stress relaxer.

Although each package obviously differs in its selection of key motivational phrases, all the programs are built around a similar structure. First is a short introductory message from the program's designers explaining the ESI method. It outlines the intention and possible reactions to the upcoming stimuli, and does well in encouraging the user to be open and responsive. Next up is a cognitive structure-type indicator, which asks you to choose from grouped lists of character traits those that would best describe your personality. This provides the program with a simple profile, enabling it to modify itself to assist your specific personality type.

The final phase is a speed-reading test. Since a large portion of the process involves the user noting flashing on-screen phrases, the program will adapt the reading speed to a level with which you are comfortable. When this skill is gauged and set, it's time to dim the lights, put on some soft music and get to know yourself.

The entire ESI process takes about 15 minutes, with words, music and computer-generated stimuli patterns blending into a relaxing session of focused concentration. After this intense quarter hour, the user then gears down in a concluding self-imaging phase. Here the viewer is asked to close his eyes and create a mental picture of how he would like his life to be—visualizing his success in any area and concentrating on that image. After a three-minute period, a tone sounds and the session is over.

For preview, I was not sent a specific series' title, but was rather given a demo disk that provided a full length sampling of how the ESI process worked, so it would be tough for me to judge the effectiveness of each program. I was forwarded an extensive information packet, detailing everything from the impressive background of Terry L. Cave, the system's developer, to the statistical analysis of actual user attitude changes.

Personal Potential Software designers have found noticeable improvements in a viewer's attitude after the program was viewed a few times, with significant and sustained levels of improvement in targeted areas after a few weeks. This same ESI process has been used by professionals in the attitudinal rehabilitation of drug abusers and alcoholics.

If it is true that each of us holds within ourselves the power to achieve whatever we dare to dream, these programs just may be the key. ■

Reviewed by Russ Ceccola

# Fleet System 4

**Computer:** Commodore 128
**Publisher:** Professional Software
51 Fremont Street
Needham, MA 02194
**Medium:** Disk
**Price:** $79.95

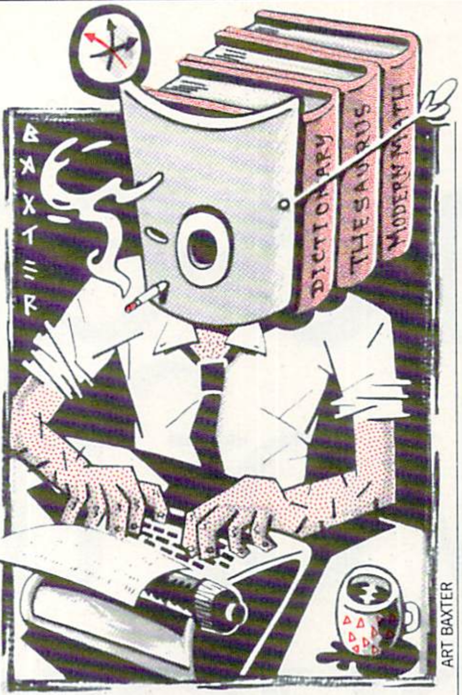
*Fleet System 4* is the latest in the series of Fleet products from Professional Software. *Fleet System 2* is a word processor for the Commodore 64, *Fleet System 3* was the same for the Commodore 128, and *Fleet Filer* is a database program that stands on its own.

*Fleet System 4* comes with three disks, two manuals, a software registration card, and a lot of claims on the package. The skeptical reviewer that I am, I decided not to let a single claim go uninvestigated. One of the disks contains the *Fleet System 4* program and printer files on one side with the spell checker on the other side. The other disks contain the Thesaurus and data base (*Fleet Filer*). Armed with these disks and a blank of my own, I put *Fleet System 4* to the test.

The bulk of the program is the word processor. After going through the tutorial and using every feature *Fleet System 4* has to offer, I came to the realization that this word processor has all I could possibly need in order to write. I don't know where to start, but I guess command entry is as good a place as any.

There are many commands that you must use to work with *Fleet System 4*. Most are accessed with a two-button combination by pressing the F1 or RUN/STOP key and another character. Also, formatting commands may be entered on separate lines, set apart by a check mark, or combined on one line by including colons between commands. In either case, the format capabilities include every possibility I could think of, from pitch and spacing to headers, footers, margins and comments.

The great thing about the word processor is that you can keep on typing without hitting RETURN until the end of a paragraph. This feature helps dramatically in arranging your lines, for the computer does all of the work. Depending on what default values you have, the process of using *Fleet System 4* is reduced to just typing the words. You don't have to waste as much space as the text takes up to include format commands. I wrote this article using *Fleet System 4* and the only extra lines dedicated to formatting/commands I had were for a change from single space to double space, for the designation of a footer, and for the centering of my byline.




*Fleet System 4* is worth the ticket price for the word processor alone.

Before you start typing, it is best to set up default values by pressing ⟨FCN⟩ V to access the table. You can set everything from the printer file definition that you will be using to the color of the background and characters. The default values can be saved to disk and are loaded along with the program. Don't worry about redefining parameters every time.

Some of the other standard features of word processors that *Fleet System 4* possesses are the cutting and pasting of text anywhere, rearrangement, insertion and deletion of text, ability to define printer drivers, the possibility of using one or two disk drives, and the definition of ranges of text by characters, columns, lines or sentences.

There are too many unique features of *Fleet System 4* to talk about in the space allocated for this review, for this program is powerful. Some features made a strong impression upon me. The tutorial that comes with *Fleet System 4* takes you through all possible situations, explaining all commands and possibilities by having you perform them on the computer.

A preview feature allows you to see what actually will be printed, thus saving paper and letting you make necessary changes to the copy. The only version of this review that I printed was my final copy. The F7 key prints the text on the screen.

On-screen help can be obtained by pressing the HELP key at the top of the 128 keyboard and subsequent letters in the menus that pop up on the screen over your text. In this way, you can never forget commands. Just pop down the help menu. The only complaint that I have for *Fleet System 4* is that because there are so many commands possible, a command keystroke card would have been more useful than having to look in the manual or help menu.

The Thesaurus is a very handy addition to the aspiring author or a creative writer. It is accessed for both antonyms and synonyms with two buttons and returns instantly with an appropriate selection of words. Along the same lines, the dictionary/spell checker contains 90,000 words and can have an additional 10,000 custom words included. On the package is the claim "Will spell check a ten-page document in just 45 seconds." So I assembled a ten-page paper and checked its accuracy, putting misspelled words in the text on purpose. *Fleet System 4* highlighted the misspelled words and finished its check in 40 seconds!

Also in the special set of features is the ability to create numeric fields in your text and do calculations with them. An Extra Text area of another 80 columns to the right of the 80 that you use for your document can be used for scratch work, note taking, and the inclusion of data fields that can be incorporated into form letters in the normal 80 columns. One final extra in *Fleet System 4* is the word counter. As both a journalist and college student, having an accurate word count is a plus while writing.

*Fleet System 4* is worth the ticket price for the word processor alone. It takes full advantage of the 80-column capabilities of the 128 and should be the perfect addition to any productivity collection. But don't trust me! Go to your nearest software dealer and try for yourself.

*Fleet Filer*, the database program included in the *Fleet System 4* package, goes for the throat of other databases. Its main menu offers all of the standard options of

*Continued on pg. 112*

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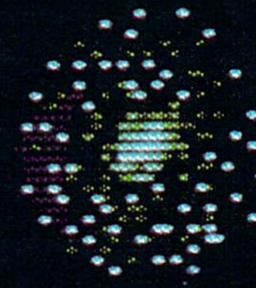
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by Dan Gutman

# What Happened to the Computer Revolution?



## The Same Thing That Happened to Every Revolution

Look at the beginnings of any new technology and you'll find striking similarities.

It seems that once-hyped computer revolution is in shambles. Software for one computer won't run on any others. Disks crash. Documentation is terrible. Software doesn't load. Companies are closing down factories, laying off workers, and filing for bankruptcy. Everybody seems to be suing everybody else. The public thinks computers are useless. Chaos and confusion reign.

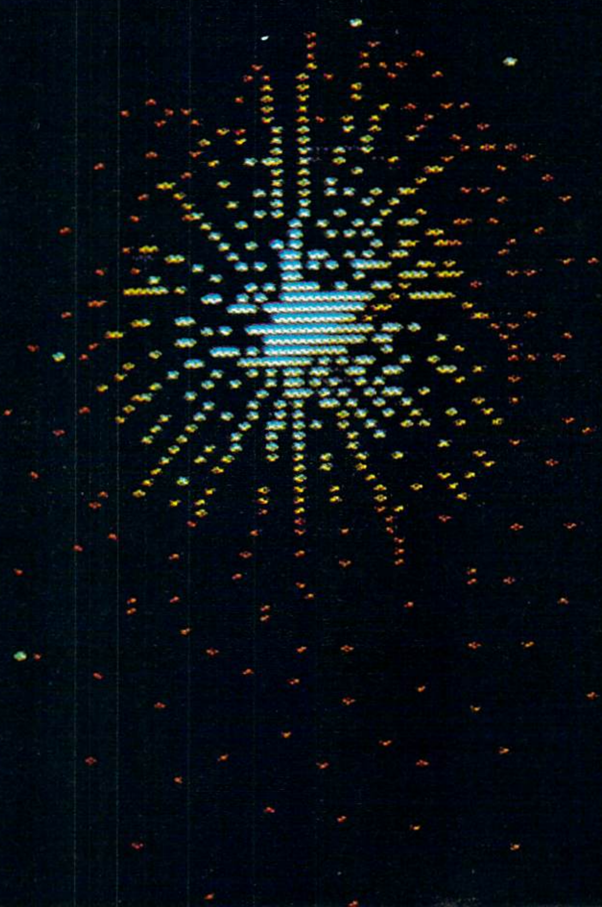
When the computer revolution was unofficially announced in the early 1980's, all indications were that it would change the world. Experts predicted that within five years, every household would have a computer. Dad would run his business on it. Mom would store her recipes on it. The kids would do their homework on it.

Today only 15% of American homes have a computer—and the other 85% don't seem the least bit interested. There is a general feeling that the home computer was a fad and that there is really no practical purpose for a computer in the home.

What happened to the computer revolution? What went wrong?

Nothing.

The personal computer first hit the market in 1977. That makes it ten years-old today. How far advanced was the phonograph after ten years? Or the automobile? Let's take a look at four technological advances we take for granted today—cars, airplanes, movies and the phonograph—and see how long it took them to be developed and accepted.





Five years after they were first available, there were 9,500 automobiles in the world. Thirteen years later, there were a million in the United States alone. Something happened in that time that made everybody stop laughing at this new technology and start buying it. It was Henry Ford's Model T.

"I am going to democratize the automobile," said Ford, "and when I'm through, everybody will be able to afford one."

That's exactly what he did. The Tin Lizzie, as it was called, was the first car that was simple, dependable, affordable and powerful. Ford's revolutionary assembly line system (bring the car to the worker, not the worker to the car) not only increased production, it also brought down prices to a level anyone could afford. The Model T started out at $850 in 1908 and was selling for just $280 in 1920. Ford sold 15.8 million of them all together; effectively bringing the automobile to the masses.

The computer industry has made tremendous strides in the last ten years, but it's still waiting for its Model T to come along.

The Model T is also a good example of what happens when somebody tries to stop the progress of technology. In 1909, Henry Ford decided that there would be "no new models, no new motors, no new bodies, and no new colors". He froze the car for 18 years.

Today's mirror image was when Apple chairman Steve Jobs introduced the Macintosh in 1984. Jobs felt the Mac was the perfect computer, and sealed the box to prevent any tinkering or enhancements. It wasn't the downfall of the Macintosh, but it was the downfall of Steve Jobs. He was forced out of the company he founded by others who knew the machine could be—and *had* to be—improved.

Technology doesn't stop advancing, so you've got to roll with it or watch everybody else pass you by.

The Model T eventually died because Ford didn't improve it. The door on the driver side didn't open—you had to vault over it. The headlights dimmed at low speeds, so you had to pull over and rev the engine if you wanted to see on a dark night. And incredibly, to check the fuel level, you had to pull out the driver's seat and dip a stick into the gas tank.

Meanwhile, other innovators improved the automobile. Seventeen years after cars became available to the public, the electric starter first appeared (on the 1912 Cadillac). Before that you had to turn a crank to start your car. It was not uncommon to break an arm or collarbone if you neglected to let go of the crank after the engine started.

It would be another ten years before innovations like four-wheel brakes, shatterproof glass, and independent suspension were invented. Twenty-seven years after cars were born, 18-year-old George Frost of Chicago installed the first car radio. It was 29 years after the auto was born that the V-8 engine was developed. It was 37 years before balloon tires were sold, and another 26 years before the first tubeless tires appeared.

Forty-six years after automobiles were first sold, the automatic transmission was first demonstrated (in the 1939 Olds-

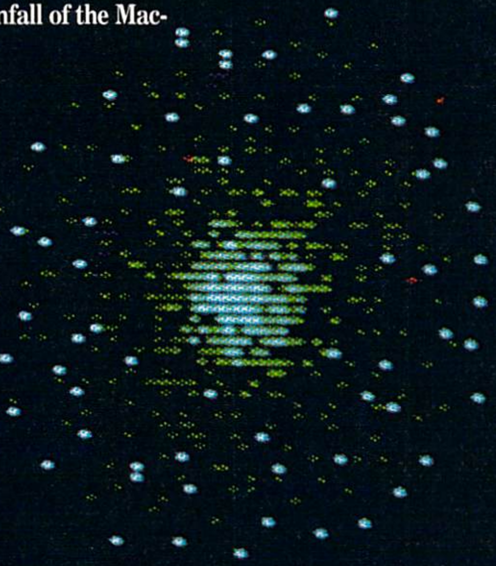
## The Automobile—1885

**Inventors: Karl Benz and Gotlieb Daimler, Charles and Frank Duryea, others**

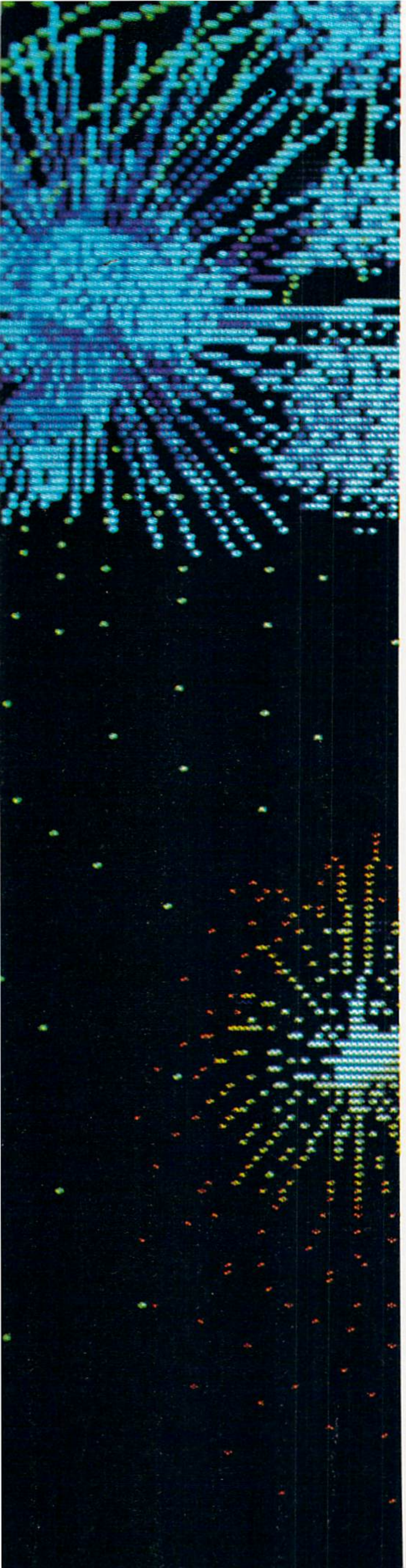
If you bought a car ten years after the automobile was first sold, it probably had a handlebar for steering and oil lamps mounted on the dashboard for driving at night. In those days, windshields and speedometers were optional equipment—that's if you could afford a car in the first place. The horseless carriage was an expensive toy for the rich. Most people only saw automobiles at a circus or a carnival.

Early cars were smelly, noisy, lacked power and broke down frequently. A catch phrase of the time was "Get a horse!"—usually shouted at an automobile owner trying to pull his car out of the mud. And this is after steam-powered cars and electric-powered cars had already been tested and rejected as impractical.

You've probably heard the term "shakeout" in the last few years to indicate that many companies in the computer industry were forced out of business. Five years after cars first appeared, there were 500 companies making automobiles! One by one, they disappeared. By 1927, there were 44. It didn't mean that motor cars were a failure. It meant too many people tried to make it in the business and most of them failed. It's exactly what happened in the computer industry.



RICHARD PAYNE



mobile). Imagine that—it took them 46 years to perfect what we take for granted today. Fuel injection would come 18 years later in the Mercedes-Benz 300SL.

But don't be deceived into thinking technology automatically gets better and better. The automobile industry has had its share of colossal flops. In 1958, Ford spent a fortune advertising its new car named after Henry Ford II's father—Edsel. As it turned out, the Edsel had noisy gears, leaky pumps, brakes that didn't work, and hubcaps that fell off. Comedians of the day compared its radiator grille to a toilet seat. Mercifully, Ford killed the Edsel after two years, 100,000 unsold cars, and a loss of $250 million.

In 1890, there were 500 companies making automobiles. By 1927, there were 44.

The automobile, after lots of stops and starts, eventually changed America. Without cars, there would be no suburbs, shopping centers, highways, billboards, drive-ins, fast food or traffic jams. Today, 90% of American households own an automobile and we consider it a necessity in our lives. But that mentality took a long, long time to develop.

*Remember, the personal computer is ten years-old today.*

### The Airplane—1903

Inventors: Orville and Wilbur Wright

The Wright brothers' airplane flew, but the idea of the airplane didn't fly. At least not at first. In fact, it went over like a lead balloon.

When Orville Wright became the first human being to lift a machine off the ground under its own power, only three newspapers picked up the story. The prestigious *Scientific American* poked fun at the Wrights. When they offered their invention to the U.S. Government and the British Royal Navy, they were told there was no future in airplanes for military use. Instead of flying and inventing, the Wrights spent a good deal of the rest of their lives in court fighting off competitors who had infringed on their patents.

But just like today's computer hackers, a small subculture became enthralled by the airplane and the thrill of mastering gravity. Aero clubs were formed all over the country, essentially as airplane user groups. They put on air shows, races and meets. They'd create acrobatic stunts for the fun of it, perhaps do a little wing walking if they were in the mood. Aviators were considered to be crackpots. Flying nerds.

*Rich* flying nerds. There were no airlines yet, and the cost of owning a plane limited the hobby to wealthy sportsmen.

The early planes were made of wood and canvas. There were no seatbelts, no safety devices, and many pilots were killed when rough landings pitched them right out of their cockpits. Aviation was considered a dangerous sport until World War I. Fourteen years after Kitty Hawk, the U.S. entered the war—with eight planes. And they were certainly not exactly *Top Gun* material.

If you think a disk crash is a disaster, imagine if you owned one of the early airplanes. In 1911 a man named Calbraith Rodgers crashed his Wright biplane 15 times in completing the first coast-to-coast flight from New York to Pasadena.

Ten years after the Wright brothers' first flight, the airplane was still a primitive, dangerous invention. It would be 11 years before the first airline was started, and that one went out of business in a few months. If would be 16 years before the first airline food (a dubious achievement if there ever was one), 20 years before the first non-stop coast-to-coast flight, 22 years before the first in-flight movie, and 27 years before the first stewardess. It wasn't until the late 1930s that the airplane as a means of transportation really got off the ground.

*The personal computer is ten years-old today.*

The first jet-propelled flight came 36 years after Orville Wright flew. British Airways started passenger jets 13 years later, but stopped them when several of their planes inexplicably exploded in midair. The jet engine didn't replace the pro-

peller until 65 years after the Wright brothers. The latest development in aviation, the SST, is still not fully accepted and is not allowed to land at many U.S. airports.

When the Wright brothers offered their invention to the U.S. Government, they were told there was no future in airplanes for military use.

Many people would say Charles Lindbergh's New York to Paris solo flight was the greatest event in aviation history, and that took place 24 years after Kitty Hawk! The computer equivalent of Charles Lindbergh's achievement has yet to take place.

### Motion Pictures—1894

Inventors: Thomas Edison, George Eastman, Auguste and Louis Lumiere, others

Thomas Edison was a brilliant inventor, but certainly no visionary. When he created his Kinetoscope, he showed little interest in projecting movies on a screen. Edison felt there would be more revenue in showing them to people one at a time, peep show-style. Obviously, he couldn't imagine movies as a shared experience. Today, we read about personal computing changing from an individual activity to one involving workgroups.

Edison thought so little of his Kinetoscope that he neglected to pay the $150 patent fee that would have protected his invention internationally. Copies from overseas robbed him of millions of dollars later. And today we hear about cheap clone computers from overseas.

Imagine seeing moving images on a screen when they didn't exist before! One early film by the Lumiere brothers was titled *The Arrival of a Train at the Station.* And that's exactly what it was—a train pulling into a station. But people in the audience were so shocked they jumped out of their seats to avoid getting run over. They had never seen a simulation of reality before.

In the early days of movies, acting was considered a degrading profession, and for a long time performers were not even identified on screen. The middle class avoided the cheap entertainment of movies. Shortly after the novelty of motion pictures wore off, everybody stopped going to the movies. People got bored. After all, how many times can you watch a train pulling into a station?

Ten years after movies were first shown to a paying audience, *The Great Train Robbery* (1903) became box office boffo. Filmed with Edison's employees near his laboratory, the 11-minute movie was a first. It was one of the first movies to tell a story. It showed the audience several scenes happening simultaneously. Instead of shooting the film in order from start to finish, director Edwin Porter shot it out of sequence and edited the scenes together later.

It would be a few years later that D. W. Griffith would introduce new wrinkles to motion pictures that we take for granted today. Griffith was the first to use the camera as anything other than a passive observer. He moved it in on an actor to convey drama. He discovered that a series of quick cuts in succession gave the audience a feeling of excitement. He developed the fade-out and fade-in to show the passage of time.

It would be 11 years before the first movie would be made in Hollywood, 29 years before Technicolor would be developed, and 33 years before the entire movie industry would be revolutionized by the first real "talkie"—*The Jazz Singer.*

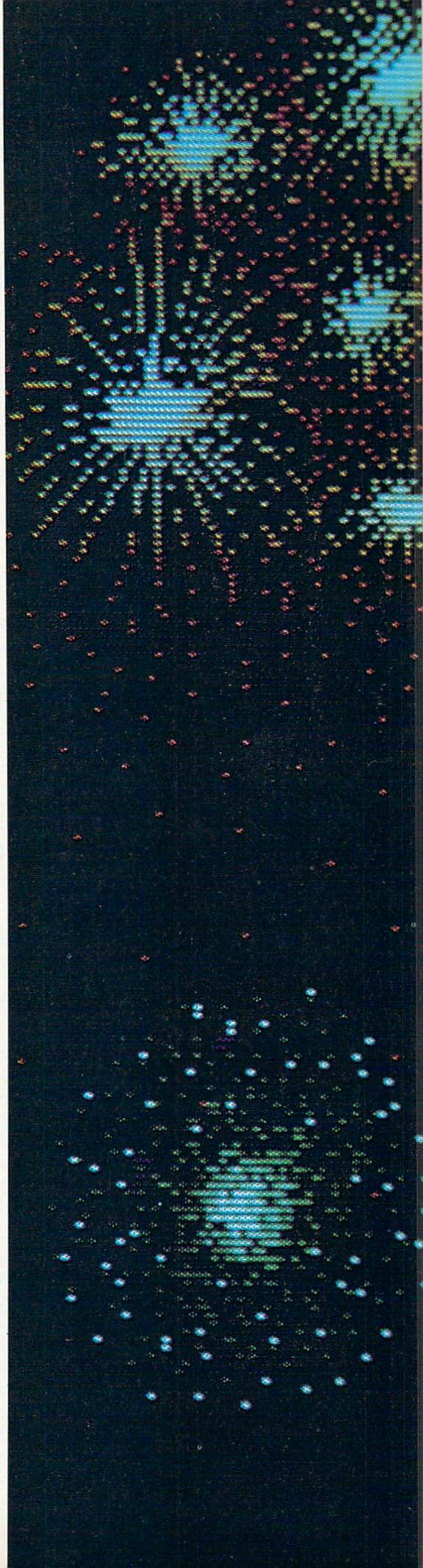
Think about that—motion pictures existed for 33 years before an actor or actress spoke a word on film. *The personal computer is ten years-old.*

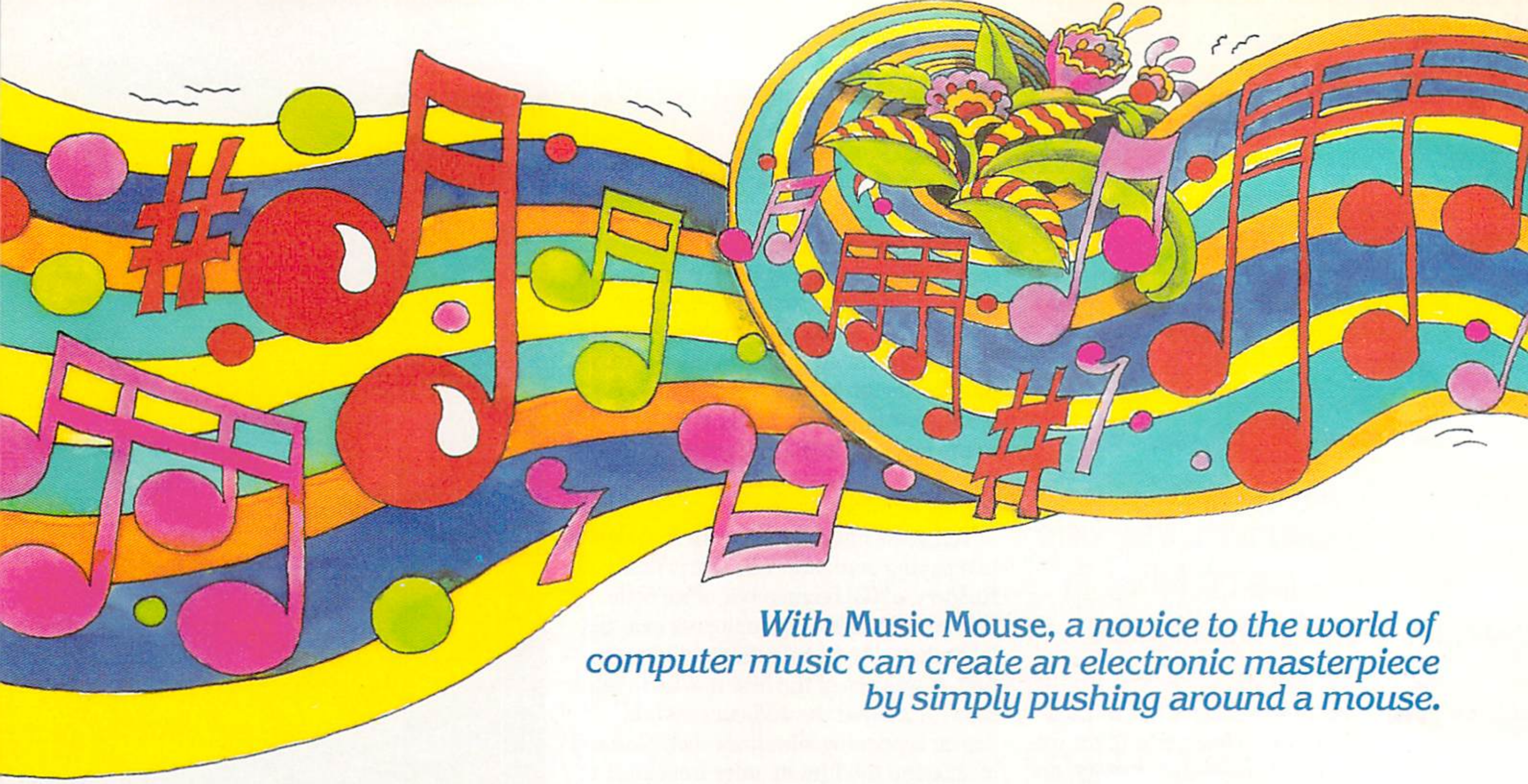
### The Phonograph—1877

Inventor: Thomas Edison

Edison's talking machine hardly resembled the phonographs we listen to today. Sound was recorded on a piece of tin foil that was wrapped around a cylinder about the size of a beer can. There were no microphones or speakers at the time, so performers had to play into large horns and

*Continued on pg. 112*





***With Music Mouse, a novice to the world of computer music can create an electronic masterpiece by simply pushing around a mouse.***

Music Mouse offers something other music packages don't—the ability to use the Amiga as a real-time, interactive instrument rather than an editor or sequencer. *Music Mouse* allows you to interact with a computer in a manner that previously required that you understand musical theory, programming and electronic music production.

## Electronic Music

Before we take a closer look at *Music Mouse,* however, let's take a quick look at electronic music in general. When we think of electronic music, we usually think of things like synthesizers, sequencers and sounds that do not necessarily come from the every-day world. But when we look around us, we can find electronic music in the sounds of many things we take for granted—from the beeps and buzzes of the electric alarm clocks to the bells and buzzes in our cars, to the alarms on our kitchen appliances to the voice that gives us our requested number from the telephone company's information operator. We have all grown used to the sounds and usually don't give them a second thought.

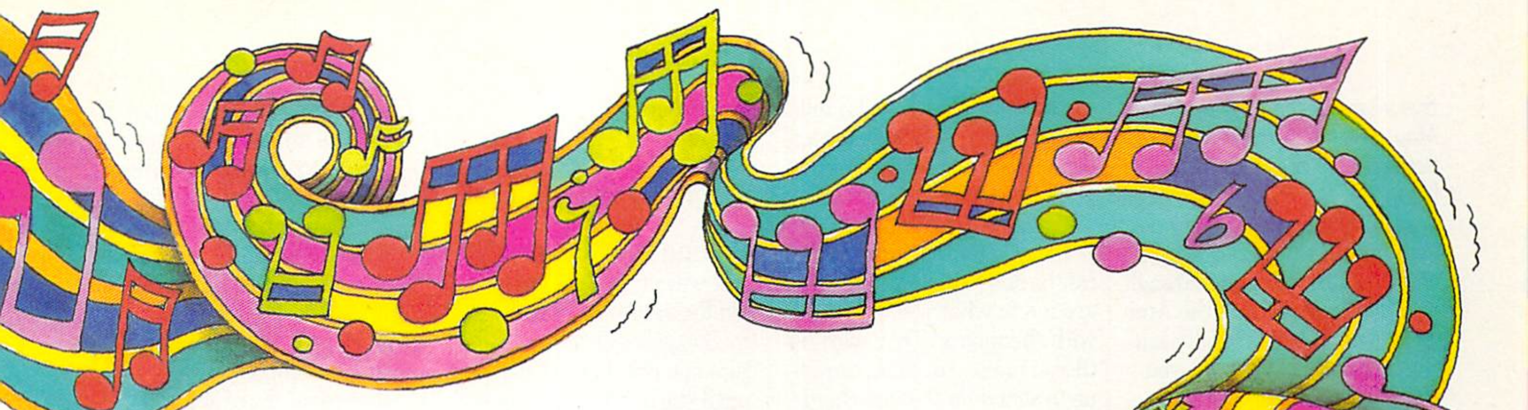
In the early stages of electronic music, however, the sounds were being produced on a much smaller scale due to the type of equipment required to produce them. Most often only large institutions had the equipment to do any serious work.

Under pioneers like Max Mathews, F.R. Moore, Roger Moog and Hal Alles, the earliest digitally-controlled analog synthesizers were brought into being. The Moog Synthesizer was the first synthesizer to be recognized by the general population through the works of a musician named Walter Carlos. Carlos' album *Switched On Bach* was an amazing hit because it introduced the world to its first taste of electronically-produced music.

These digitally-controlled, analog units eventually gave way to the fully digital units that most of us are familiar with today. Companies like Moog and Arp, to name but two, were leaders in the production of units that most professional performers could afford. Since those early days, however, electronic music has become easier for the average person to get involved with. Companies like Casio and Yamaha have created digital synthesizers that are available for less than $200—putting the power of the synthesizer within the reach of most of us.

For computer owners, the realm of electronic music is easy to enter. On just about every type of computer, there is one or more packages available to manipulate the sound-producing facilities of the machine. If you are an Amiga owner, you not only have a very powerful computer, but you also have a very advanced music production system. The processing power built into the Amiga allows you to create and manipulate computer-generated sounds or to sample actual musical instruments. These sounds may be used as they sound or you can re-engineer them to make them sound like something completely different.

A simplistic example of this re-engineering is in the sounds used to create the alien music by the Cantina Band in the original *Star Wars* movie. The instruments didn't sound conventional while in actuality they were normal instruments like the clarinet and saxophone that had been run through electronic processors where the signals were changed to give a flat, non-earthly sound.



## An Exclusive Preview

# Music Mouse

by Tim Jones

### Music Programs

There are currently a number of music programs available for the Amiga. Of these programs, I have seen *Music Studio* from Activision, *Deluxe Music Construction Set* and *Instant Music* from Electronic Arts, *Sonix* from Aegis Development, and *Music Mouse* from Opcode. Of these five, *Music Studio, Deluxe Music Construction Set* and *Sonix* are what might be called musical processors. They allow you to enter the notes of the song, edit them until you get the results that you are after, then store the results. They cannot be considered interactive, however. Two of the programs, *Music Studio* and *Sonix*, not only let you edit the music, they also give you the ability to edit the actual sounds.

*Instant Music* is of a different type. It is a combination music processor and interactive program. *Instant Music* allows you to enter music, albeit in a non-standard form, edit it, store it, and interact with it via what is referred to as mouse jam. This allows you to perform against a preset background pattern that operates like a sequencer playing a programed series of notes over and over.

The final program, *Music Mouse,* is where we get away from the concept of using the computer as a musical editing and compositional tool completely and get into using the computer as the actual performance instrument.

### Music Mouse

*Music Mouse* gets its name from the method in which you play it— using the mouse. You select things like the pitch content, what sounds will be played, one or two lead voices, the method in which the voices follow the mouse, and whether you are controlling a MIDI device, the Amiga's internal voices or both. The display consists of a series of four keyboard maps (one on each border of the screen) and four colored lines that indicate what notes are being played.

You can use *Music Mouse* just as soon as you sit down to it. It doesn't require that you understand what pitch content, envelope, MIDI or any of the other functions available do. It requires only that you know how to move the mouse. There are no fingering exercises, theory lessons, sore lips or fingers and no critical instructors to cope with. In fact, my



five year-old son enjoys *Music Mouse* so much that I have to turn off the computer to make him stop.

*Music Mouse* is very simple, yet will allow you to control all of its various functions through pull-down menus and the Amiga's keyboard. It is totally self-contained, but will allow you complete control of MIDI devices on one of four MIDI channels. It uses the standard IFF SMUS instrument files, so you can use sampled instrument sounds from most of the IFF compatible packages on the market. It does not try to duplicate a conventional instrument—what it does is utilize standard musical concepts in the areas of patterns, chord structures and tonal balance to allow people with no musical background to make music.

*Music Mouse* works with the Amiga's internal voices as well as MIDI devices. The program has presets for using the Casio CZ-101, an inexpensive, MIDI-compatible keyboard, the Mirage sampling keyboard, and a generic MIDI device. You can also select which MIDI channel you will be using. In fact, the program is so complete, you can play your MIDI device entirely from *Music Mouse* and never have to change a single setting on your synthesizer. There are MIDI controls for selecting which MIDI sound is active, operating a MOD wheel, adjusting the amount of portamento, adjusting the breath controller, adjusting the foot controller, setting the level of aftertouch, and selecting the velocity rate and volume.

You are also given full control of the visual parameters within the program. Each voice is represented by a colored line on the display. You can change the color of the displayed lines, the background, the keyboard templates and the borders. You can also tell the program to draw your performance which will cause the voice lines to leave trails on the screen as you play.

There are nine patterns that can be started to play as background to what you are doing with the mouse. They wait until you pause and then continue to sound on the last chord that you played in the manner that the pattern was defined. Then as soon as you move the mouse, they relinquish control back to you. Your performance can be made up of chords, arpegiated chords, played as if strummed on a guitar or improvised upon by a smart routine. All of which can be changed by selecting a menu item or pressing a key.

You can transpose the tuning up or down by semitones, select and set two different tempos and select the type of harmony that is to be used in the manufacture of the chord structures. The harmony types available are octatonic, chromatic, Middle Eastern, diatonic, pentatonic and quartal. If these don't suit you, you may turn off the harmony keys and use a totally free-form harmonization.

Because of its design, *Music Mouse* may be multitasked, allowing you to have more than one copy in memory at a time that then lets you control a MIDI device under one task and the Amiga's internal voices under another and have different patterns and voicings running at the same time.

Because of the differences between *Music Mouse* and the other conventional music processors, I felt that a simple software review would not be enough, so I got in touch with the creator, Laurie Spiegel, to find out more about what goes into the creation of a program like *Music Mouse*.

## Behind the Scenes

It was originally written for the Apple Macintosh by Spiegel as just something that she could enjoy. It wasn't until she had been prompted by friends that she considered putting *Music Mouse* out as a commercial package. After the package was seen by the people at Commodore, she was approached and asked if she would be interested in porting the system over to the Amiga. She agreed and work was begun on converting the program from the Macintosh to the Amiga. To aid her in the job, she called on the talents of one of her ex-students, David Silver. Together, she and Silver began work on the duplication of *Music Mouse*'s function on the Amiga.

It wasn't long before *Music Mouse* began an evolution which took it from its existing form on the Macintosh to its new expanded form on the Amiga. Spiegel will very quickly give credit to Silver for the job that has been done Amiga-tizing *Music Mouse*. He has created an excellent set of menus and a very nice display to make the program more than just a port from the Macintosh.

Here is a discussion with this talented designer.

**Jones:** What was it about computer-controlled music that led you into the electronic music arena?

**Spiegel:** It was composing that led me into electronic music. Primarily, I am and always have been, a composer. One of my teachers at Julliard, Michael Tchaikovsky, whom I was taking ear training from, dragged me down to New York University to their composers' workshop and showed me this loopless synthesizer which, basically, brought composing back into a live mode where you're working directly with the sound, rather than an abstract notational representation. It brought an improvisational quality back into composing that I had lost when I had gone from improvising to composing.

That was one of the big things that led me to computers when I decided I was really fed up with the analog synthesizers around 1973 and went out in search of memory and more sophisticated logic. At that time, of course, you had to work with tape and tape techniques— there was no other means of storage (using an analog synthesizer) until we had computers. It was the immediacy of the combination of the (computer's) electronics with the analog synthesizers that attracted me. Also, the timbral range and the fact that you could get a process going and interact with it—something that couldn't be done while writing notes down on paper.

I was not really ever interested in non-real time stuff and also only marginally interested in the computer as a means of sound synthesis, which has been the dominant trend in computer music. That was never of that much interest to me. I was always more interested in what I consider the syntactic level of musical content. The definition of processes as interaction, the elaboration of musical materials, and the evolution of melodies.

Even from the very beginning, I specialized in those areas while the vast majority of the electronic musicians dealt with signal and used the computer primarily for synthesis. That's why I've always used computer-controlled analog synthesizers from the beginning. That was the only way to get into real-time inter-

action with the computer program because you couldn't digitally synthesize sounds in real-time until the late 70's.

**Jones:** What is it about you that makes you different from the more conventional electronic musicians?

**Spiegel:** The important things about me that make me different are partly that not only was I not interested in simulating conventional instruments, but I wasn't actually interested in the computer as a means of synthesis at all. I was interested in it as a means of composition. The creation of sounds was not what drew me to the computer. I could make much more interesting sounds using analog synthesizers. I didn't need computers for that—I needed them for the logic and the memory. Also, unlike other composers, I was not willing to go out of real time.

**Jones:** After working with systems like the GROOVE at Bell Labs and Hal Alles' project, what led you to creation of *Music Mouse*?

**Spiegel:** Well, I originally created *Music Mouse* for myself. I wanted a way to use my Macintosh interactively, and *Music Mouse* was the result. I originally had no plans to release it, but so many of my friends enjoyed it and kept prompting me that I finally decided to try and market it.

**Jones:** What kept *Music Mouse* from becoming just another music processor like most of the others on the market?

**Spiegel:** Why should I reinvent the wheel? We already have all these programs that do that. Last spring I was reading articles about a music software shakeout. I couldn't believe it. If it's too competitive doing sequencers and editors, why doesn't someone do something else? There's plenty of room for many people to produce music software.

From the first release of *Music Mouse*, I've gotten many letters and calls about making it more like a sequencer. Maybe people want me to make it more like a sequencer because it hasn't occurred to them that there are all of these other things that haven't been realized.

**Jones:** What do you feel is the one change that you would like to see in a future release of *Music Mouse*?

**Spiegel:** One thing is the patterns. The patterns are cyclically repeated. Since I first released the program, people have been clamoring for the ability to put in their own patterns. I, on the other hand, want to put in features where by these patterns evolve on their own. These are two ways to get around the redundancy problem. As they are, they are simply repeat loops. They are hard-coded in there and they will continue to be the same. If you let the players enter their own, the ones that they enter are also going to be looping around in circles.

This isn't the way I'd like to see the program evolve, though. I wish to write an algorithm that will allow the melody pattern to grow. This gives me a certain amount of public conflict and I feel that what I want to do and what people ask for differ. The reason I feel that they differ is that I see possibilities that I know will work musically that other people don't see. That is the main reason that *Music Mouse* is different from the other music programs. I'm just a different person and *Music Mouse* is my program.

**Jones:** Where do you see music headed?

**Spiegel:** Music is going through changes. I think we've had for hundreds of years this notion of the composition—the piece. In the last three or four hundred years, the whole idea of the composer who created the piece has been the dominant factor in most minds. In fact, that is the goal of anyone that is a creative artist—to become the composer and have a number of pieces that they have created that have their name on them. This, of course, gives them royalties because that's the way it's always been.

But things are changing. One of things that computers do is really mess up the traditional specializations in music. Suddenly you've got composers who realize their own work so that they don't need performers to perform them. Those roles are reunited. And now, with intelligent processors like *Music Mouse*, listeners can create music for themselves. The entire musical process begins to break down between the composer, the performer and the audience. You get an instrument builder who says "Okay, these processes can be reunited. The listening, composing and performing—everybody can do these." It isn't that much of a specialized area any more.

I know that a lot of the ways that music is integrated into our lives is changing. One of the big changes is that music is becoming a process that people can participate in—rather than a bunch of fixed, finite entities called pieces that you can listen to that are the same every time. This kind of change is going to take a long time to be excepted.

**Jones:** What does this mean to the average musician?

**Spiegel:** Well, it's going to be a real mess out there for a while. It's a disaster for a lot of people to start with. I hear that there are approximately a third as many performing musicians making a living with studio gigs as there were eight years ago due to the advent of the synthesizer. I mean, why should you hire a string section when a single keyboard can do the same job? This is what Local 802 here in New York has been worried about since the end of the 60's. It's, however, only since the advent of MIDI that these worries have begun to bear fruit.

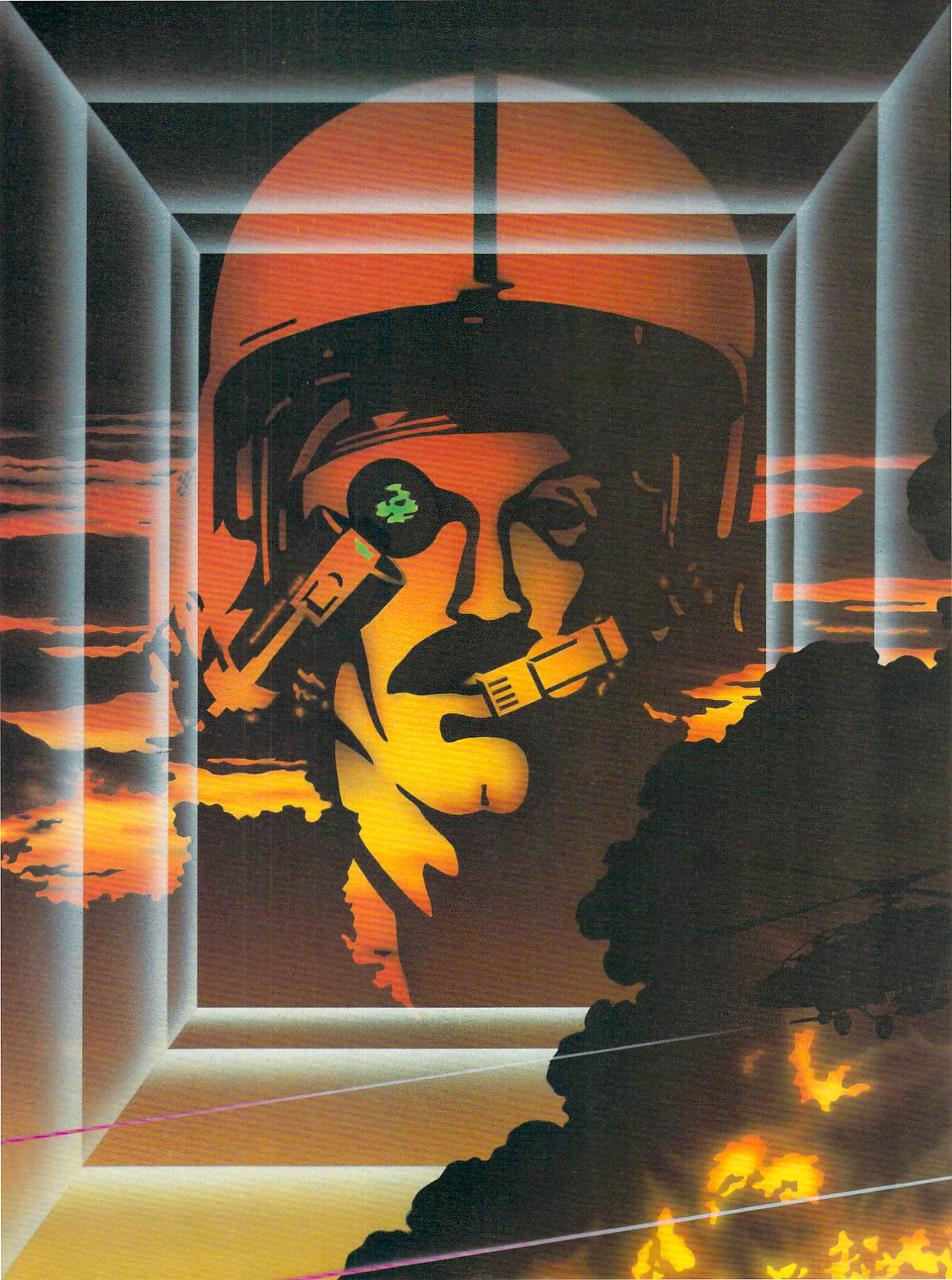
This has not happened yet with composition. With compositional software, it is possible for someone who made their own film to make the soundtrack without the involvement of a performing musician much more easily than could have ever been the case prior to the advent of the intelligent music processor. In the case of *Music Mouse,* it functions as an expert system and lets a choreographer or filmmaker generate their own music instead of having to hire a composer to do so. You begin to get artificial experts or intelligent software to generate music. This could cause the role of the composer to get shaken up in much the same manner as the role of the studio musician.

**Jones:** Where will this take music for the casual listener?

**Spiegel:** That's a pretty heavy thing to think about. What I think will happen is a decentralization of the creative output. In general, it's been a small number of people composing for the whole culture and then the bottle-neck at the distribution end with producers only passing what they feel will make money.

Now you've got a situation where everybody at the grassroots level can find it pretty easy to make music. It's really going to change a lot of things and it's hard to predict where it will lead. I can't say whether it will be predominantly good or

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# Risk-Free Adventure

by Gary V. Fields

## Flying High at MicroProse

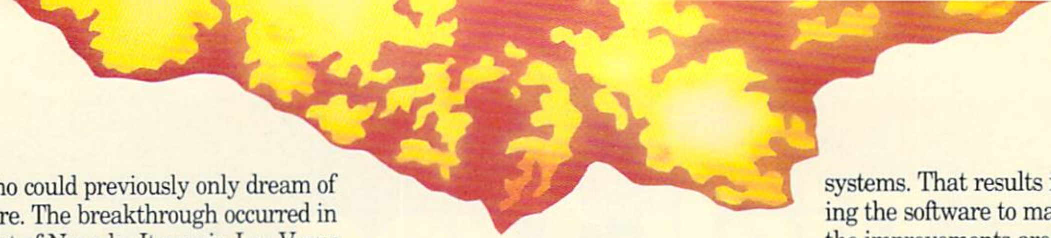
**High adventure—the desire of many, the experience of few. Who hasn't secretly yearned to fly a supersonic jet, lead an army in a desperate battle, or change history? Up to now, life offered few chances to live dangerously. But today's computers offer us all the chance to experience adventure—without risking our necks.**

Commercial airlines have used flight simulators for years to train pilots. The armed services use war simulations to solve problems real armed conflicts present. In fact, war, as terrible as it is, remains the game supreme for both adventure and challenge, and the battlefield will always be the most demanding playing board. But few of us, even if we could, would wish to endure the terrors of war simply for the adventure.

During the War Between the States, General Robert E. Lee remarked that "it is good that war is so terrible or else man would become too fond of it." He was right, but still men remain fascinated with the subject. If examined void of emotion, war is truly the perfect game—there are few rules, no time limits, and an infinite number of variables to consider, plus high risk goals all played against the challenging background of life and death. To win at war, you must not only overpower your opponent, you must outthink him. Most of our best loved games, be it chess or football, simulate the appealing elements of war—attack, defense and strategy.

With the development of powerful, affordable computers like the 64, riskless combat and adventure simulations became feasible and affordable for all





those who could previously only dream of adventure. The breakthrough occurred in the desert of Nevada. It was in Las Vegas that two of the world's leading creators and distributors of simulation software joined forces—sparked by a simple bet.

The year was 1981. Before a chance meeting in Las Vegas, Sid Meier and Bill Stealey had never met, though they worked for the same company. Meier was a young programmer enjoying the excitement of the expanding frontier of computer technology. Stealey was trying to settle into civilian shoes after an adventure-filled career as a U.S. fighter pilot. After a busy day of meetings, the two met over a drink while relaxing in the hotel's lounge. In the corner, a quarter arcade version of Red Baron was swallowing silver as fast as the public could feed it.

The stage was set. Meier turned to Stealey and said, "I bet I could design a better aerial combat game than that."

Stealey glanced at the machine and back to Meier and countered, "If you can create it, I can market it."

The seeds of MicroProse had been planted. It took a full year, but Meier proved he could back up his bet, and Stealey was as good as his word. The result was the formation of MicroProse in 1982, and its first product *Hellcat Ace.*

I've been a hater of war but a lover of war games since the seventh grade. There were few computer war games on the market back then, because only the Pentagon could afford a computer powerful enough to simulate anything. But in the past few years, personal computers have become powerful enough to bring adventures to life. And most of the best of those are MicroProse titles. So when I found myself in Baltimore, Maryland, it didn't take much of an excuse to get me on the road north to Hunt Valley which MicroProse calls home. I wanted to meet Meier, the king of simulation, to find out what kind of minds put the sting in simulation and how they do it.

I splashed through the puddles of a summer shower and wiped my feet on the welcome mat in the lobby of MicroProse. Before I could unfold my umbrella, I was sitting across the desk from the friendly face of Fred Schmidt, the company's director of marketing. He described how the company grew from a staff of 2 to 45 in five years, increased that to 60 plus in 1987, and expanded to England—the same year many software companies were thinning their staffs to balance their financial books.

"This company has grown in leaps and bounds from the day it began," said Schmidt, adding that the reason it has been so successful is that it is an employee-owned company. "Everyone here has a stake in the company's success—everyone's attention is right where it should be."

"Every Friday afternoon the entire staff is required (yes, required) to assemble in the main conference room to play computer games."

Unlike most software distributors, all of MicroProse programs are created in-house. Most other leading software companies rely upon independent programmers or smaller development groups to create software which they simply market and distribute. But MicroProse does it all—research, creation, coding, packaging and marketing. "The only thing we occasionally job out is some conversion work to translate existing products to other computer systems. But even that we are reluctant to do."

Schmidt explained, "A lot of our stuff is written in a language we call SidTran, which is Meier's own internally-developed language which most people aren't familiar with. So we can't farm much of the work out to other programmers." Another reason for this is that MicroProse prides itself on not simply translating games from system to system.

"Unlike many software producers," said Schmidt, "we convert our software rather than simply translate it. Different computer systems have different strengths. So if you play *Gunship* on a 64 and later play it on an Amiga, you're going to see an entirely different game. The 64 is a great computer, but it is nothing compared to the Amiga. To simply plug the 64 version of any of our simulations into an Amiga wouldn't do justice to the system, the game, or the customer who buys our simulations. So rather than transport the games, we convert them to fit the different systems. That results in delays in bringing the software to market, but we think the improvements are worth the time.

"Most companies can bring a game to market in three to six months," said Schmidt. "It took us 18 months to do *Gunship* for the 64, six months longer than we expected. But we think the quality was worth the delay and from the reaction we receive from our audience, they agree. We spent another year finishing the Amiga version. That's longer than we'd like, but we intended to do it right. If you think the 64 version is exciting, wait until you fly the Amiga *Gunship.*" [Note: As you read this, the Amiga version of *Gunship* should be ready for market.]

I had flown the 64 version of *Gunship* and I was excited. In fact, I've seen every program the company markets and I've yet to put a single game disk back into its sleeve without being excited.

Schmidt turned me over to Ed Bever, the one person at MicroProse I had talked with before my trip. Like all the people I met that day, Bever was professional and especially articulate when computers and games were mentioned. Before he took me on a short tour of the office, he explained how a product is developed.

"Unlike an arcade game, a simulated game is based on a real action, period in history, or possibility. Creating a simulation isn't as simple as coming up with an idea and coding it," explained Bever. "With a simulation you have to be true to the subject. For instance, in a game like *Crusade in Europe*, if you command a unit to move from point A to point B and a mountain lies between the two, it should take the unit longer to move between those two points than if the battlefield was flat.

"Another problem is controlling the game. The simulation has to be manageable—not so complex that the player can't handle it, yet not so simple that realism is lost. One of the real time killers, and at the same time what makes MicroProse games so true to life, is the time spent in researching the subject."

After researching and developing the graphics for both *Crusade in Europe* and *Decision in the Desert,* Bever knows all too well the pain and strain of getting details right. After all that is settled, programming can begin. Normally, that means Meier takes over. His job is to make the simulation as true to life as a game can be and still fit on a 13-inch screen and in

64K of memory.

Ask anyone and they will tell you that Meier, senior vice president of software and co-founder of the company, is the driving force that makes each program happen. In the early days, he did all the design and programming work himself, leaving the company's president, "Wild" Bill Stealey, to take care of running the company. (No one explained why Stealey was called "Wild" but after hearing some of the stories about his real-life flying experiences, I suspect the title is appropriate.)

A knock on one of the office doors was answered by the sports-shirted king of simulation, Meier. His office was busy but functional; with the emphasis being on functional. It was apparent he was more concerned with the product he was coding than impressing visitors. On one desk a 64 nestled in a bed of papers and disks. The original packaging box served as a stand for the color monitor. Atop the monitor a plastic model of the submarine used to create MicroProse's underwater simulation, *Silent Service*, stood sentry. On another desk an Amiga 1000 waited.

Most of what Meier said echoed the remarks I had heard before. But the one thing that stuck in my memory was his enthusiasm for the Amiga. In fact, he said development of *Gunship* had begun on the Amiga almost as soon as the first computer arrived at MicroProse. But because of the power and early unknowns of the system, development was switched to the 64 because it was a computer which all the programmers were already familiar with.

Returning to his office, Bever discovered that his computer monitor had been stolen. I couldn't believe it. Then Bever looked at his watch and said, "Oh, I forgot, today is Friday." Now I was really confused. Is it legal to steal computer hardware on Friday afternoons in central Maryland? It turned out that it is, at least at MicroProse. Every Friday afternoon the entire staff is required (yes, required) to assemble in the main conference room to play computer games. So just before the weekend, mysterious hands collect all the loose systems, connect them on the long conference table, and wait for the contestants to assemble.

The conference room competition is normally supervised by Stealey, who Schmidt says is, without a doubt, the best gamer in the company. "He plays every one of our games inside and out. There is probably no one in this place better at a game, unless it's the game's designer himself."

But why does everyone have to play the games, I asked. The answer was simple.

"Simulation software is our business. To know and be able to play our products is just good business."

Simulation games are different in every aspect to arcade games. Although the action may sometimes resemble the speed and challenge of arcade, for example, *AcroJet* and *F-15 Strike Eagle,* these are thinking games. Schmidt explains, "You have to learn a lot to do anything decent with our products. You have to read the manuals and the more you know about the elements in the simulations, the better you will perform.

"We do months of nothing but research on a subject before we begin a project. We spend time in the library with military personnel, with Major Stealey (U.S.A.F. Reserve) and his contacts to really find out what a subject is all about. We try to take all that information and digest it before we begin to design a game.

"We're not trying to train fighter pilots or submarine captains. What we're trying to do is give people who will never have a chance to go inside a submarine the opportunity to get inside one and take it for a spin around the block to see what it is like. Our simulations give them that chance. They get a close-up look at simulated real life. They feel it, they experience the adventure. And at the end of the adventure, we want them to feel they got their money's worth."

> "To simply plug the 64 version of any of our simulations into an Amiga wouldn't do justice to the system, the game, or the customer who buys our simulations."

After the fellows finished their training session (my wife would have called it an excuse to play), I got to spend some time with Arnold Hendrick, one of the game designers. Like all the people I met that day, Hendrick was willing to listen to other people's ideas. Hendrick proved again that there are no stereotypes when computer users are considered. In fact, before I left he surprised me again by revealing that his second love is music and that he was, in fact, a concert pianist as well as a programmer. As we talked, he demonstrated *Gunship* (don't go near MicroProse this year if you don't want to hear about *Gunship*). He explained part of the reasons why the game is receiving editorial ovations.

"A helicopter is a very attractive and romantic craft. A lot of media stuff has gotten people interested in helicopters (Blue Thunder, AirWolf), but few people have the opportunity to actually fly one. *Gunship* gives you the chance," said Hendrick.

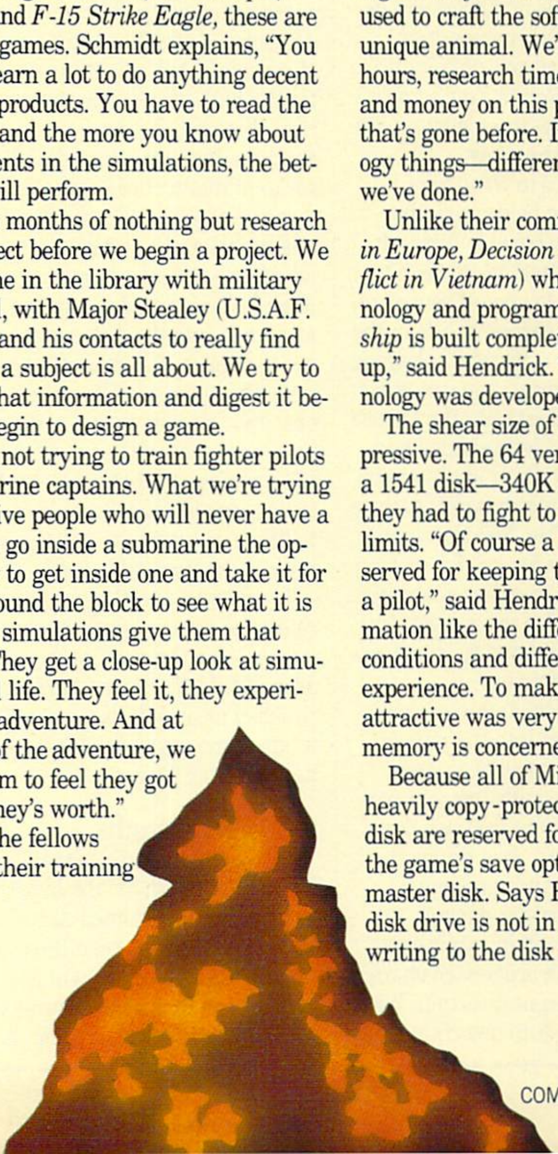
But just as important as deciding upon a good subject for a simulation is the care used to craft the software. "*Gunship* is a unique animal. We've spent more man hours, research time, develop-ment time and money on this project than anything that's gone before. It's doing new technology things—different than anything else we've done."

Unlike their command series (*Crusade in Europe, Decision in the Desert* and *Conflict in Vietnam*) which use similar technology and programming routines, "*Gunship* is built completely from the ground up," said Hendrick. "A lot of software technology was developed for this program."

The shear size of the simulation is impressive. The 64 version fills both sides of a 1541 disk—340K of code. Hendrick said they had to fight to keep it within those limits. "Of course a lot of that space is reserved for keeping track of your career as a pilot," said Hendrick, "and unique information like the different terrain, weather conditions and different options you can experience. To make the game visually attractive was very expensive as far as memory is concerned, too."

Because all of MicroProse's games are heavily copy-protected, two tracks on the disk are reserved for saves to make sure the game's save option cannot destroy the master disk. Says Hendrick, "If someone's disk drive is not in perfect alignment, writing to the disk wouldn't corrupt the

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by Shay Addams

# Seven Quests for the Price of One

**News and opinion from a leading explorer of those fantasy realms called adventure games.**



SUSAN LIPPMAN

If you've finished *Destiny Knight* and don't want your sword to get rusty, grab a torch and plunge into *Realms of Darkness*, the latest role-playing game from Strategic Simulations. In the land of Grail, your bank of eight explorers go after the royal sword of Zabin, hidden in the ruins northeast of town. The quest isn't over when you find it, for there are six more missions to accomplish. Completing all seven quests means hacking and spellcasting your way through 30 dungeon levels whose walls and doors are depicted from a first-person perspective. Only their outlines appear—no color or details as in the *The Bard's Tale* series—and the color pictures of the monsters are a lot rougher around the edges.

Though the graphics in *Realms of Darkness* leave a lot to be desired, the game introduces some novel features. It combines the parser-style interface of text adventuring with the keyboard control of standard role-playing games. While in the town or a dungeon, or even while slogging through a swamp or forest, you can punch the RETURN key and activate the game's adventure mode. An oblong-shaped window pops up in the top third of the screen, where you may type in commands such as "examine the boulder" or "get the scroll." Keyboard commands are used for moving your party, equipping weapons and other actions, and you can also use a joystick to move your party around and to choose selections from various menus.

You get to pick which character performs the actions typed into the parser window. Even more control over your characters is available with the split-party command. Suppose you find two doors at the end of a long hall. Just divide the party into two groups and send one through each door. If you're daring enough—and enjoy watching your crew get wiped out—you can order each character to march in a different direction. With multiple parties you get to determine how much time will be alloted to the different groups during each turn. Two other aspects of the game system are worth noting: you can move diagonally as well as horizontally and vertically while in towns and outside, and can save the game anywhere—even in a dungeon.

Magic-users will learn 69 spells, and fighter-types may wield an assortment of swords and armor. In combat you cannot designate a specific target among a group of monsters, but must fire away and hope for the best. This reduces the need for tactical thinking during a battle. Other than that, combat is conducted with a familiar series of menu choices whose results are displayed in text. The main difference between this and a regular text or graphic adventure is that when you realize what must be done to solve a puzzle, you can't just stroll into the appropriate room and get the object or perform the correct action. There are usually scores of ogres, orcs and other monsters to dispatch before you can do so—if they don't get you first. It's a tough one that Strategic Simulations says should take at least 150 hours to finish. (I know one veteran who has been stuck for weeks now.)

In addition to a thorough manual and reference card, you get maps of two dungeon mazes, the town and the outdoors area. While *Realms of Darkness* is not as polished as an *Ultima* or *The Bard's Tale*, it offers enough unique features to satisfy hard-core orc slayers.

## Quest for Laughs

Life is not all monsters and mayhem in Adventure Land, for the latest pair of Infocom games are aimed at the funny bone instead of dead between the eyes. *Hollywood Hijinx* takes place in Malibu, where you have to find ten treasures hidden in your uncle Buddy's mansion. A producer of B-movies like *Vampire Penguins of the North*, Buddy had the house rigged up with props left over from the films, and the results will keep you grinning all the way to the surprise ending. Infocom has stopped classifying their games by difficulty, but I'd call this one intermediate level.

More difficult and even funnier is Douglas Adams' latest Infocom adventure, *Bureaucracy: A Paranoid Fantasy*. Instead of doing a *Hitchhiker's Guide* sequel, he based the story on one of real life's frustrating events: his bank lost the change of address form Adams filled out when he moved, and as a result, his credit cards soon became useless. The maddening part of the experience was that the inescapable red tape made it almost impossible for him to get bank officials to acknowledge his new change of address form. That's what happens to you in *Bureaucracy*, whose first scene is not a location, but a form you must fill out onscreen.

Then you find yourself in a new apartment, having just moved from Rhino Drive, New Jersey, to start a new job at Happitech, Inc. The company is sending you to a course for new employees, and you'll leave for Paris as soon as you get enough money to pay for a cab to the airport. That's no problem, for Happitech already mailed you a $75 check. Well, there is one slight problem: your change of address form went awry and your mail was delivered to one of your neighbors. Rounding it up is no easy task, for these folks are so paranoid they make Woody Allen look secure. (One of them even looks like Woody Allen, except for the fact that he's carrying more guns than Rambo.)

Besides the countless Catch-22s that make everyday life so interesting, Adams elicits non-stop chuckles, titters and out-

right guffaws with zany responses to commands that don't work or are not understood by the parser. When I tried to break a door (yes, adventure reviewers get that frustrated too), the program told me I needed "permission in triplicate from Infocom." Kicking the door, it turned out, "violates the Cambridge Convention, which prohibits it in humorous games." (But you can kick the travel agent, which I strongly recommend.)

In most Infocom games, you read "Congratulations, your score just went up five points!" when you do something right. Do something wrong in this one and a message informs you that "Your blood pressure just went up!" Instead of the score appearing at the top of the screen, your blood pressure is displayed, a novel way of keeping track of your failure instead of your progress. (It's also a subtle form of self-satire that crops up frequently in recent Infocom games.)

Another novelty is that the address you enter on the form at the start of the game is used for the name of the first location, and your street's name appears as part of each location in the early part of the game. The top score is a whopping 21 points, but don't let that fool you. *Bureaucracy* is the toughest Infocom game since *Spellbreaker.*

Also look for Infocom's first horror adventure, *Lurking Horror* by Dave Lebling, and *Stationfall*, Steve Meretzky's sequel to *Planetfall.*

## Amigadventures

Five of Sierra's highly rated IBM games have been converted for the Amiga. The trio of *King's Quest* adventures, which feature cartoon-like characters that you move around the screen via joystick or keyboard commands, have a smart parser, sharp graphics with many special effects, and—most important—logical puzzles.

In the first game, you become Sir Graham, a knight who must find lost treasures and return them to King Edward in order to become the next king. In the sequel, *Romancing the Throne*, you are the King of Daventry, and seek to find and free an enchanted maiden and make her your queen. And in *To Heir Is Human*, you are their son, Gwydion, striving to escape the clutches of an evil wizard and claim your heritage. In this one you can cast spells by typing in their names, somewhat like Infocom's *Enchanter* series. It also has a self-mapping feature. If you'd rather venture into outer space than into a fairy tale, *Space Quest* employs the same game system in a science fiction satire. *Winnie the Pooh in the Hundred Acre Wood* is a child's game presented with the standard full-screen graphics and a couple of text lines below.

Sierra has its own method of presenting 3D graphics. In each highly detailed and multi-hued scene, some elements are set back in the distance, while others are in the middle of the scene or near the front of the picture. Your character might walk behind a tree, then pass in front of a house or castle, which creates a unique sense of depth. Playing these games, in which your character and others are extremely well-animated, is comparable to participating in an interactive, animated cartoon. Pop-up text windows are filled with far more text than most graphic adventures.

Puzzles and points are also handled differently. Many problems have alternative solutions, with more points awarded if you used the hardest answer to solve the problem. That means that if you didn't achieve the top score the first time you complete the adventure, you can try again. ■

by Robert W. Baker

# Inside Q-Link

**Explore the inner workings of the Q-Link telecommunication service with network pro Bob Baker.**




ART BAXTER

So you've uploaded a file for one of the various download libraries on Q-Link—what happens to the file now? Where did it go? Why doesn't it show up on the system for a few days? Here's what happens to your file once it's been uploaded to the system.

First, when you attempt to upload a file, you're asked to enter a description that will accompany the file in the download libraries. This description is entered just like typing a message for the regular message boards, with all the normal editing features. After this description is transmitted to Q-Link, the file itself is loaded from your disk and transmitted to the system as well.

If a related group of files are required as a matched set, or the file is extremely large, you might want to consider using the Arc utility to combine and/or compress the files before uploading them to Q-Link. Also, take your time entering the description—the more complete the information you provide, the easier the SYSOP's job will be later on. Besides, your time spent in the upload function is not a plus charge service.

After the file is uploaded, it's stored in a special shadow area where it's accessible by the SYSOPS in charge of that area. The SYSOPS process files uploaded to their area when they appear in their shadow area. The first thing they do is download the file and make sure it can be downloaded properly. This ensures that the file was actually received by the system correctly in the first place and that the file can be downloaded again without errors.

They then try using the program or examine the data if it's a documentation-type text file. The SYSOPS try to make sure that the file is not copyrighted material and does, in fact, do what it claims to do or contains accurate information. Additional SYSOP guidelines prohibit software or files that are in bad taste or are derogatory of any on-line system.

Other things that are considered by the SYSOPS when they examine an uploaded file or program are whether it duplicates a file already available on the system, whether or not the file applies to the specific library it was uploaded for, and the overall quality of the program or file. Some programs that do not run or have other problems but may be of general interest sometimes are included in the new Workshop libraries with notes added by the SYSOP indicating the problems.

The SYSOPS specifically try to weed out "trojan horses." This is a term commonly used to describe programs designed or modified by someone to specifically destroy files or perform some other mischievious task once they're downloaded and run. Sometimes things slip through, and if you see something in the download libraries that you feel shouldn't be there or encounter a problem with a specific program, let the SYSOP know via E-Mail.

The other task the SYSOPS are involved with is the editing of the file descriptions that users enter when uploading files. A standard utility is run on the system every day to create a special file that the SYSOPS must download, edit and re-upload to the system. This template file is used to indicate where the file is to be transferred to make it available to all users. It also contains a place for the subject line that is displayed when you scan a download library by subject instead of filename.

The SYSOP must also edit the other fields that appear when users view the descriptions in the download libraries. These include fields for the program author, shareware information, and whether additional files and special hardware or equipment are required. All of these fields in the template file must be filled in by the SYSOP.

A system utility similar to the one that created the template files then processes the returned templates after the SYSOPS have edited and re-uploaded them. This occurs during the day when no users are on the system. When the template is processed, the file is either added to the download library specified or it's deleted from the system, depending on what the SYSOP enters in the template. Once the file is moved to the library area, it's available to all users when the system comes back on-line that evening.

All of this takes time, especially on the part of the SYSOPS who bear the burden of checking everything out. After you upload your file, the SYSOP can check out the file later that night or some time the following day. The template file is created the following morning and is available to the SYSOP the following night. After the SYSOP downloads the template file, it will normally be edited and re-uploaded the following day.

Thus, it will normally take at least two days to get the file live and available on-line to all users. Of course, this assumes the SYSOP has unlimited time, which is normally untrue. If a large number of files are uploaded at one time or an extremely

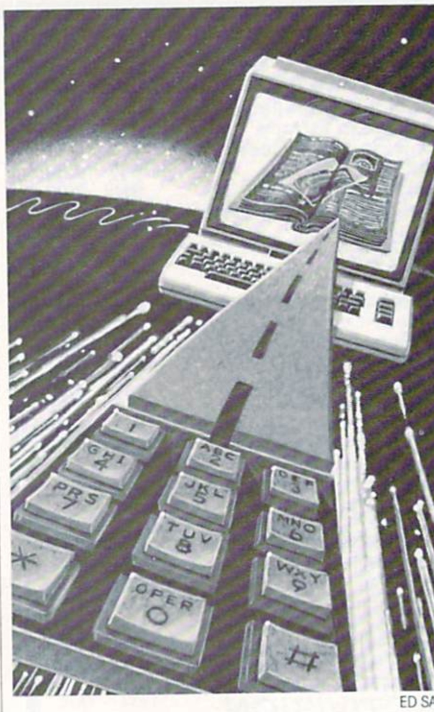
*Continued on pg. 116*

by Suzanne McCoach and Dan Schein

# Connect!

## *A Guide to Telecommunications Literacy*

**Become an on-line expert in this ongoing telecommunications tutorial.**


ED SAUK

In the past seven articles, we have explained everything you need to know to telecommunicate. In this article we discuss some of the better telecommunications books.

*The Computer Phone Book: Directory of Online Systems*
*The Computer Phone Book: Guide to Using Online Systems*
*The Computer Phone Book: Online Guide for the Commodore Computers*

These three books were written by Mike Cane and are most informative. The *Directory of Online Systems* is a listing and review of BBS systems in the U.S. and Canada. There are listings from most areas of both countries and notes BBS that have a special interest. This book also touches upon the many commercial on-line services available. Each service is explained in detail with examples of menus and other system-specific information. This should prove to be a valuable aid for those considering the many commercial services and trying to decide what system(s) they want to join. This book was printed in June, 1986, and most information should still be valid.

The *Guide to Using Online Systems* is very similar to *Directory of Online Services*, except it deals more with the commercial database services and only lightly touches upon BBS systems. Much care and detail is given in explaining the difference between the services and also exactly how to use the services. Information ranges from how to log on to what is available. The printing date is June, 1986, and again, most of the information should still be very useful.

The *Online Guide for the Commodore Computers* is a book that shows how to use your Commodore to go on-line. It covers items like hardware, software and other information that will be of great help. The book we have has a printing date of May, 1984, so most material is still useful but rather old. Also note that the only Commodore computers covered are the VIC 20 and 64. We do not recommend this for your first book.

*Compute's Personal Telecomputing*

Written by Don Stoner, this book is for anyone with an interest in Commodore computers and telecommunication. We highly recommend this book for everyone from the beginner to the advanced modem user. All the many different areas of telecommunications are covered and explained in easy to understand detail. There are programs to type in and many other items that make this book a must have. This book is not only good for the beginner to learn from, but it makes an excellent source of reference material for the more advanced modem user. With this book you can go from a novice to an expert. The copyright is 1984, but since most information deals with hardware and software rather than the many BBS and commercial services available, this material is still very valuable.

*The Complete Handbook of Personal Computer Communications*
*How to Get Free Software*
*How to Look it Up Online*

These three books were all written by Alfred Glossbrenner and apply to users of all computers. *The Complete Handbook of Personal Computer Communications* contains information starting with what is available to the modem user, what you need, and how to use it. This is an excellent book, but it deals with non-Commodore type of hardware and software. We do not recommend this book for the first-time 64 or 128 modem user looking for information.

*How to Get Free Software* deals mostly with where to obtain software, but one area covered is the BBS and commercial services. Many users have found that in addition to the exchange of information in the form of messages, the ability to upload and download a program pays for the initial cost of telecommunications hardware and software in no time. This book is worth looking into.

*How to Look it Up Online* is a comprehensive guide of the many commercial information services available. These services range from the stock market to searches of newspapers and encyclopedias. If you have a need for this kind of information, then this book is invaluable.

*Connections: Telecommunications on a Budget*

This book was written by Robert Chapman Wood and contains information ranging from what is available for the modem user to connect to what you need, and how to use it. This is a good book, but the information is covered in a general way, so most of the specifics about hardware and software are non-Commodore. This book is copyrighted 1986, so the information should not be out of date.

*Understanding Data Communications*

This book is by far the best technical reference on telecommunications that we have seen. It was written by George E. Friend, John L. Fike, H. Charles Baker, and John C. Bellamy of Texas Instruments. *Understanding Data Communications* covers almost anything you could want to know about data communication. This book is easy to understand and seems well suited to individual self learning. If you want to know more about data communications, then this book is very highly recommended. It's another must have!

*Answers Online: Your Guide to Information Data Bases*

Barbara Newlin provides a guide to the various types of commercial database services available along with descriptions and reviews of the services. Most of the major popular services are covered. This book can serve as a guide to help decide what service(s) you want to become a

*Continued on pg. 117*

by Ian Adam

# Connections

*Computers in a Video World*

What started all this was a retirement dinner. As part of the evening, an entertainment program was prepared, including a multi-media presentation—a mixture of live skits, prerecorded video, and live video. Because of the extensive video role, the concept for the evening was that of a television station, showing various programs and commercials that told about the life of the guest of honor.

Of course, the computer had a role too, and this was to prepare various visual materials to be worked into the video portions of the presentation. All of the advance video material was prerecorded on video tape and played back for the audience through several large monitors. Although this was a fairly major presentation, the techniques used are really quite simple and easily applied.

Around the home, you can use this approach to dress up your own videotapes: adding titles, directories, or a variety of other features. A similar approach can be used for a computer-generated business presentation or to run advertising material in a storefront, for example. A club could pre-record video material about itself and use it to recruit new members.

## How It's Done

Before the main television presentation began, a computer-generated test pattern was displayed on the monitors. This was used as introductory material while equipment was being set up and the audience prepared. A clock in the test pattern counted down the minutes until the show started.

For this I used the Commodore 128 in its GRAPHIC 1 mode. The built-in graphics commands for lines, boxes, painting and text made this easy, as Program 1 demonstrates. If you have a 64 instead of the 128, you will need to use one of the many graphics command packages that are available. The test pattern is easily customized by inserting any name of your choice, and of course, the clock can be set to count up to any target.

The next step is to prepare a series of title screens to introduce each of the various segments of the show. For this purpose I wanted something bright and bold; something that would grab the attention of the audience and provide some continuity between the different segments.




JOYCE SKIFFINGTON

That task sounded tailor-made for the Koala Pad. I used a black background for contrast, selected a wide brush, and sketched out some interesting screens. These were then filled in with bright colors and color patterns, then spliced into the tape at appropriate moments.

An essential third step was the credits. Any large production involves a number of people, and it's only fair to give them proper credit for their contributions (especially when they're volunteers, as in this instance). This was a very simple matter of printing the various names to the screen and slowly scrolling the text upward. Program 2 shows how this is done, and is great for titling your own videotapes. You input the credits to be shown and make some basic selections on speed and spacing, then roll 'em. This will work on either the 64 or the 128.

For part of the credits I needed larger letters. The solution was to use a utility that prints text of any specified size onto the 80-column screen of the 128. If you don't have access to this technique, you can still build large letters on the 40-column screen of either computer, with creative use of the keyboard graphics.

Another jazzy way to show credits is to scroll them across the screen sideways. A good way to do this is a program in the August/September, 1986, *Commodore Power/Play* called Screen Banner. With minor modification of that program, I found that I was able to show a Koala Pad picture on the main part of the screen, while text credits scrolled smoothly across the bottom. This formed a very effective ending for the entire program.

Having developed all of this material, the next step was to transfer it onto videotape. You can use your computer's modulated TV output for this purpose, but the composite monitor output is far superior. (This is the 40-column monitor connection on the 128.)

Most recent model VCR's have a special monitor input, although I would wager that the majority of computer owners don't realize that you can make this connection. First you must locate this input, which consists of two small concentric jacks known as RCA (or phono) connectors, marked video in and audio in.

The cable that you need connects five-pin DIN to four RCA plugs. With the DIN end in your computer, these four plugs become chroma, luma, audio out and audio in. The audio out plug goes into the VCR's audio in connector. The only problem is that your computer has those two video outputs, chroma and luma. You can get a Y-connector at your friendly electronics store for a couple of dollars if you want, to plug them both into video in. I just used the chroma plug by itself, however, and it worked fine.

If you have a 1701/1702 monitor, then you already have the right cable—just disconnect the plugs from the back of the monitor. If you don't already have the cable, the good news is that it's readily available at most stereo and electronics stores for under $10. While you are there, pick up two or three plain RCA-to-RCA cables; we'll talk about those in a moment.

Taping the 128's 80-column screen is more tricky, since VCR's generally don't have RGB connectors. There is one way around this—by using an RGB-to-monochrome cable. These cables are hard to find, but you can make your own. You will need a 9-pin male subminiature connector, and one of the RCA cables I mentioned. Cut the cable in half and fasten the center wire to pin 7 of the connector. Fasten the outer braided wire to pin 1. This is a simple job for anyone experienced with soldering, but if you're not, get a friend to help.

When you're ready, plug the connector into the RGB output and the other end of the cable into video in on the VCR. The only limitation is that you will only get monochrome, which is quite adequate for credits.

Once everything's hooked up, you can proceed to edit and record your graphics on videotape. Note that the VCR will also accept a sound track to accompany graphics, regardless of whether you are working with 40 or 80 columns.

## More Connections

The connection from computer to videotape is a very useful one, but it only scratches the surface of what you can accomplish with your 64 or 128. You might be interested to see a more complete list of possibilities.

1. As we have discussed, you can connect either the 40-column or 80-column monochrome screen to a VCR and record your sound and graphics creations.

2. You can channel these computer signals through the VCR to a television without recording them. If you are presently connecting the computer directly to a TV with the switch-box that was supplied, you may be able to get a better quality picture using the VCR instead; it is also the only way you can view RGB on a television set.

3. Most VCR's also have jacks marked video out and audio out. Using plain RCA cables, you can send this output to your monitor, thus converting it to a TV. This is great for those days when you just have to watch two football games simultaneously. VCR manufacturers advertise that you can tape one program while you watch another. With this setup, you can also keep an eye on the progress of the taping. With the 64's monitor, plug the cables into the front connectors and flip the signal-select switch on the back. For the 1902 monitor, plug the cables into the two round jacks in the back, select the 40-column screen, and remove the computer cable from the DIN connector marked 2.

4. The 80-column screen of the 128 can be shown in monochrome on a 1701/1702 series monitor. You will need a special RGB-monochrome cable. Lug it into the video jack on the front, set the signal-select switch on the back, and turn the color control all the way down. This is good if you have upgraded from a 64 to the 128, but haven't got a new monitor yet.

5. The sound output from either computer can be fed into your stereo system. Use the DIN to RCA cable mentioned before and select the audio-out jack. The back of your stereo should have a pair of plugs marked aux in, tape in, or something similar. Plug the cable in there and set the stereo to select that source. The output, of course, will be mono only.

6. One channel of your stereo can be fed into the computer and processed through the sound chip. The fourth RCA plug on the end of your monitor cable, audio in, is normally not used; plug it into one of the stereo jacks marked aux out or tape out. BE CAREFUL HERE—don't plug into a speaker output or you could damage the computer. Also, don't try to combine this with the previous connection or you'll set up a feedback loop.

7. Yes, you can photograph the screen of your computer, and very nicely, too. You will need a camera that allows you to adjust the settings and also a tripod. Adjust the monitor controls for a good picture, clean the screen with window cleaner. Set the camera on the tripod, directly in front of the screen. (If the camera is crooked or off-center, you will get a distorted picture.) Since the screen has different proportions than the camera, you will have to include part of the monitor case in order to see the whole screen. Set the camera to 1/30 second, or better yet, 1/15. If your camera has an automatic flash, disable it or cover it. Set the aperture or any other controls your camera requires in the usual way. The room must be darkened to prevent reflections on the screen; alternatively, cover the camera and screen with a blanket. Being careful to avoid jarring the camera, press the shutter button. The first time you try this process, you may want to experiment a bit with different settings to see what works best with your particular combination of equipment. Once you get the hang of it, you can get great photos, either prints or slides.

## Program 2 Instructions

- Enter credits in order (present limit of 100 can be changed).
- To change color, press ", then a color key, then enter the credit.
- To place extra blank lines, press shift-space, then RETURN.
- When finished, press RETURN.
- Indicate whether you want additional blanks between lines.
- Give a delay value between lines (100-200 is typical).
- Indicate whether the credits are to be centered.
- The credits will then by displayed. At any time, you can press a key and RETURN to enter more credits.
- The credits will then roll again.
- To end the program, press STOP while credits are running.

## Final Tips

One caution I should mention—do be careful, because there will be no one but yourself to blame if you happen to fry some computer parts by connecting the wrong things.

With that in mind, be creative! There are lots of ways to apply your computer to create video material. Just because the output is informative, that doesn't mean it can't be bold, with lots of bright color, even motion. It can be great fun, and very useful too.

If you try all of these connections, your computer room may begin to look a lot like a spider web... mine usually does! Even if you only try one or two, though, I think you'll find your computer just that much more useful. And, if you should happen to come up with some other connections, let me know.

## Parts

*Monitor cable:* 5-pin male DIN to 4 RCA plugs, available at most stereo stores, especially with European equipment.
*RGB to monochrome cable:* hard to find.
*RCA cables:* Radio Shack part# 42-2365 or 42-2309 (set of 4), available through stereo stores with designations such as #MVA-92.
*Y-connector:* Radio Shack part #274-303 or 42-2436.
*9-pin male subminiature connector:* Radio Shack part# 276-1537. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

### Program 1
### for the Commodore 128

```
20 REM TEST PATTERN'BLLB
30 :'ABHY
100 GRAPHIC 0,1:COLOR 0,1:COLOR 1,11
    :COLOR 4,15'ERXB
110 PRINT"[CLEAR,L. RED]
    TEST PATTERN FOR THE COMMODORE
    128"'BAFG
120 INPUT"[DOWN2]NAME TO SHOW";N$'BDMB
130 INPUT"[DOWN]MINUTES,
     SECONDS TO COUNT TO";M,S'BEYH
140 T=60*(60*M+S)'EJVD
150 :'ABHA
200 GRAPHIC 1,1'BDHW
```

Continued on pg. 70

*Continued from pg. 69*

```
210 BOX 1,20,14,300,186'BPLA
220 PAINT,0,0:COLOR 1,14'CJVB
230 CIRCLE 1,160,100,40,30'BPCC
240 CIRCLE 1,160,100,80,60'BPJD
250 DRAW 1,80,100 TO 240,100'CPSF
260 DRAW 1,160,40 TO 160,160'CPCG
270 :'ABHD
300 BOX 1,30,20,60,180,,1'BRPB
310 BOX 1,260,20,290,180,,1'BTUC
320 :'ABHY
330 PAINT ,100,90'BHXC
340 PAINT ,150,120'BIUD
350 PAINT ,170,90'BHFE
360 PAINT ,200,120'BIQF
370 CHAR ,20-LEN(N$)/2,22,N$'EOVJ
380 :'ABHF
500 TI$="000000"'BDCB
510 DO'BAJA
520 CHAR ,17,2,TI$'BJPD
530 LOOP WHILE TI<T'DDPF
540 :'ABHD
600 GRAPHIC 0:END'CCYB
```

END

### Program 2
### for the Commodore 64 and 128

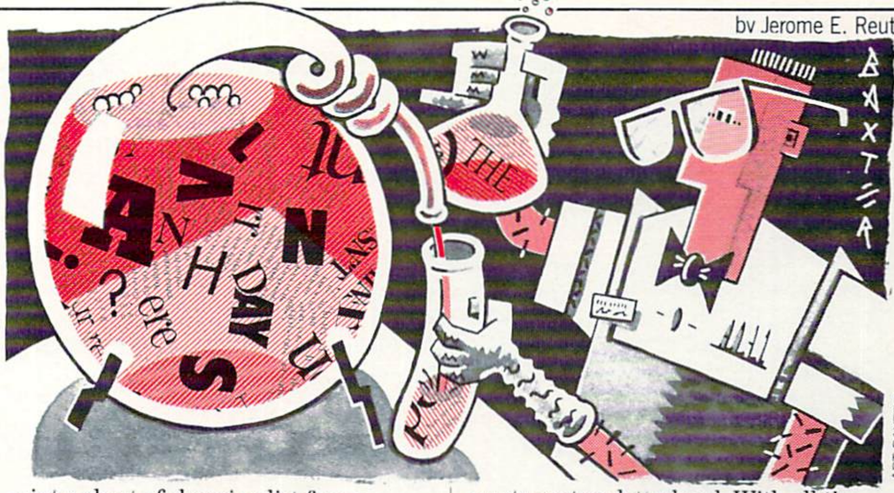
```
20 REM ROLL THE CREDITS'BOHC
30 POKE 53280,0:POKE 53281,0
   :DIM C$(150)'DXAF
40 :'ABHA
100 PRINT"[CLEAR,L. RED]VIDEO CREDITS
    [SPACE3]COMMODORE 64 OR 128"'BASF
110 PRINT"[DOWN2]ENTER CREDITS."'BALA
120 PRINT"PRESS RETURN WHEN FINISHED
    :"'BABF
130 FOR N=N TO 100'DFEB
140 PRINT N;:INPUT C$(N)'CIFB
150 IF C$(N)>"" THEN NEXT'EFGD
160 :'ABHB
200 INPUT"# OF BLANK LINES BETWEEN
    CREDITS";S'BCDF
210 INPUT"DELAY BETWEEN LINES
    (1-500)";D'BCEE
220 INPUT"CREDITS CENTERED Y/N";
    C$'BDQE
230 C=C$="Y"'CDDB
240 PRINT"[DOWN7,WHITE]
    PRESS ANY KEY TO QUIT"'BAIG
250 FOR I=1 TO 24:PRINT:NEXT'FGTF
260 :'ABHC
300 FOR I=0 TO N+24/(S+1)'GJRC
310 T=C*(LEN(C$(I))/2-20):SS=S'GSSG
320 PRINT TAB(T) C$(I)'CHKB
330 :'ABHA
340 FOR J=1 TO D:NEXT'EEGE
350 GET A$:IF A$>"" THEN 100'EIZG
360 IF SS THEN SS=SS-1:PRINT
    :GOTO 340'GMWJ
370 NEXT'BAEE
380 :'ABHF
400 GOTO 100'BDAY
```

END

# Printing Lab

## *for the Commodore 64 and 128*

by Jerome E. Reuter



ART BAXTER

The name of the program is Printing Lab, but don't let that fool you. This BASIC program is not meant to be a knock-off of Broderbund's *Print Shop*. Printing Lab will produce greeting cards (a dozen different card fronts) and do custom letterhead and quick sign production, but the similarities end there. Printing Lab prints on the Commodore MPS-1000 printer, and should run without modifications on the MPS-801 and MPS-803, as well as the other brands that are set up to work with PETASCII.

The main screen of Printing Lab introduces the program and instructs the user to load and ready the printer. The next screen is the menu screen where all the user has to do is enter a selection and Printing Lab will go to work.

The first option will print a 40-column screen memory map complete with a numbering system superior to the one found in the 128 operator's manual—without any work or input from the user. The second option is just as easy. Select it and the color memory map for the 40-column screen is printed and numbered.

The third option will print a sheet of memo pad forms, four to a page. No input coaxing needed. The fourth option will print a sheet of shopping list forms. (Again, no keyboard coaxing is needed.) The fifth option will print phone message sheets with the words WHILE YOU WERE OUT! using underline instead of minus dashed lines to create a more professional look. The four to a page is the rule here to prevent paper waste and provide user ease.

The sixth option prints note cards. Twelve different card fronts are offered, and they print extra fast because they're not printed bit-mapped. The option of including an inside passage is available in all 12 (changing a note card into a greeting card) as is the option of putting your one-line string on the back. I find note cards that print this fast to be a real help when a note to the school teacher is needed before the bus gets here in the next few minutes.

The seventh option allows the user to create custom letterhead. With all the printing functions, the use of line deliminators is allowed with a special subroutine. The pound key will exit the routine and the RETURN key will print the string (in card and letterhead printing the lines are automatically centered). This routine allows the use of enhanced or normal type and the combination of both. The eighth and ninth options are typewriter simulators that come in real handy all over the office.

Throughout the program, much thought was given to the different ways an untrained operator could mess up an input request, and the system has been worked out to the point where anyone who can read and press keys can produce professional results without trouble. Take me up on that statement and have an operator with very little experience run this program—and see how easy it really is. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

### Printing Lab

```
10 PRINT"[CLEAR]":POKE 53280,1
   :POKE 53281,0'DQPC
20 REM PRINTING LAB BY JERRY REUTER
   109 BARBARA DR LADSON S.C.
   29456'BBIM
30 K$="[RVS,YELLOW] WELCOME TO THE
   PRINTING LAB C-64/128 "
   :XR$="[HOME,DOWN4]":GOSUB 1410'DLUN
40 K$="[RVS,YELLOW] DESIGNED BY JERRY
   REUTER (C)OPYRIGHT "
   :XR$=XR$+"[DOWN2]":GOSUB 1410'EOVQ
50 K$="[RVS,YELLOW] FOR THE COMMODORE
   64 OR 128 COMPUTER "
   :XR$=XR$+"[DOWN2]":GOSUB 1410'EOHR
60 K$="[RVS,YELLOW,SPACE2]
   AND THE COMMODORE MPS-1000 PRINTER
   [SPACE2]":XR$=XR$+"[DOWN2]"
   :GOSUB 1410'EOSS
70 FOR X=1 TO 450:NEXT'EGFG
80 K$="[RVS,RED,SPACE3]
   PLEASE MAKE SURE YOUR PRINTER IS
   [SPACE3]":XR$=XR$+"[DOWN4]"
   :GOSUB 1410'EORT
90 K$="[RVS,RED] TURNED ON,
    AND THE PAPER IS LINED UP "
   :XR$=XR$+"[DOWN2]":GOSUB 1410'EOYU
100 K$="[RVS,RED] PROPERLY,
     THEN PRESS ANY KEY TO VIEW "
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EOWL
110 K$="[RVS,RED] THE SCREEN MENU OF
    PRINTING OPTIONS. "
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EOTM
120 GET A$:IF A$=""THEN 120'EICB
130 GOSUB 1430:GOSUB 1450'CJEA
140 K$="[RVS,WHITE] 1=PRINT THE VIC
    CHIP MEMORY MAP (40) "
    :XR$="[HOME,DOWN2]"
    :GOSUB 1410'DLGN
150 K$="[RVS,RED] 2=PRINT THE VIC
    CHIP COLOR MAP (40)[SPACE2]"
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EOWP
160 K$="[RVS,CYAN] 3=PRINT A SHEET OF
```

```
    MEMO PAD FORMS 4UP"
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EODR
170 K$="[RVS,PURPLE] 4=PRINT A SHEET
    OF SHOPPING LISTS 4UP"
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EOES
180 K$="[RVS,GREEN] 5=PRINT A SHEET
    OF PHONE MESSAGES 4UP"
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EOQT
190 K$="[RVS,ORANGE] 6=PRINT A
    GREETING CARD (12 CHOICES) "
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EOVT
200 K$="[RVS,L. RED] 7=GO TO THE
    CUSTOM LETTERHEAD [POUND]=ESC
    [SPACE2]":XR$=XR$+"[DOWN2]"
    :GOSUB 1410'EOKM
210 K$="[RVS,BLUE] 8=GO TO THE
    TYPEWRITER W/NORMAL PRINT"
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EOGN
220 K$="[RVS,YELLOW] 9=GO TO[SPACE2]
    TYPEWRITER W/ENHANCED PRINT "
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EOAO
230 K$="[RVS,GRAY3] 10=RESET THE
    PRINTER DEFAULTS & QUIT "
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EOYP
240 K$="[RVS,L. BLUE] ENTER YOUR
    CHOICE, AND PRESS <RETURN>"
    :XR$=XR$+"[DOWN2]":GOSUB 1410'EOLQ
250 INPUT A$:X=VAL(A$):IF X<1 OR X>10
    THEN PRINT"[UP2]":GOTO 250'KSEM
260 ON X GOTO 270,340,410,450,490,610,
    980,1180,1300,1500'CSHL
270 GOSUB 1430:PRINT"[CLEAR]"
    :OPEN 4,4,0:PRINT#4,
    CHR$(14)+CHR$(31)'HWOM
280 PRINT#4,"VIC CHIP MEMORY MAP (40
    COL.)":PRINT#4,CHR$(15)'DJVO
285 PRINT#4:GOSUB 1490'CGVL
290 PRINT#4,SPC(16);"1111111111222222
    2222333333333"'CGXN
300 PRINT#4,SPC(6);"01234567890123456
    789012345678901234567890"'CFWH
305 PRINT#4:PRINT#4'CDJD
310 FOR I=1024 TO 1984 STEP 40'ELBC
320 PRINT#4,I;:FOR X=0 TO 39
    :PRINT#4,"[SHFT O]";:NEXT
    :PRINT#4,"[SHFT G]":PRINT CHR$(13)
    :NEXT'KXBL
330 FOR X=0 TO 45:PRINT#4,"[CMDR T]";
    :NEXT:GOSUB 1470:PRINT"[CLEAR]"
    :GOSUB 1450:GOTO 140'JYTL
340 GOSUB 1430:PRINT"[CLEAR]"
    :OPEN 4,4,0:PRINT#4,
    CHR$(14)+CHR$(31)'HWOK
350 PRINT#4,"VIC CHIP COLOR MAP (40
    COL.)":PRINT#4,CHR$(15)'DJFM
355 PRINT#4:GOSUB 1490'CGVJ
360 PRINT#4,SPC(17);"1111111111222222
    2222333333333"'CGYL
370 PRINT#4,SPC(7);"0123456789012345 6
    789012345678901234567890"'CFXO
375 PRINT#4:PRINT#4'CDJK
380 FOR I=55296 TO 56256 STEP 40'ENNK
390 PRINT#4,I;:FOR X=0 TO 39
    :PRINT#4,"[SHFT O]";:NEXT
    :PRINT#4,"[SHFT G]":PRINT CHR$(13)
    :NEXT'KXBS
400 FOR X=0 TO 46:PRINT#4,"[CMDR T]";
    :NEXT:GOSUB 1470:PRINT"[CLEAR]"
    :GOSUB 1450:GOTO 140'JYUJ
410 GOSUB 1430:PRINT"[CLEAR]"
    :OPEN 4,4,0:FOR P=1 TO 2
    :PRINT#4,CHR$(14)+CHR$(31)'KBEL
420 FOR X=1 TO 2:PRINT#4,"MEMO[SHFT Z]
    MEMO[SHFT Z]MEMO[SHFT Z]MEMO
    [SPACE2]";:NEXT X'FJVM
425 PRINT#4:PRINT#4,CHR$(159)'DJFI
430 FOR L=1 TO 13:PRINT#4,"[CMDR @19,
    SPACE2,CMDR @19]":PRINT#4'FJXF
440 NEXT L:NEXT P:PRINT"[CLEAR]"
    :GOSUB 1450:GOTO 140'FNQI
450 GOSUB 1430:PRINT"[CLEAR]"
    :OPEN 4,4,0:PRINT#4,
    CHR$(14)+CHR$(31):FOR X=1 TO
    4'KBOP
460 PRINT#4,"[SHFT Z]SHOPPING[SHFT Z]
    ";:NEXT:PRINT#4:FOR X=1 TO 4'GKHN
470 PRINT#4,"[SHFT Z,SPACE2]LIST
    [SPACE2,SHFT Z]";:NEXT
    :PRINT#4,CHR$(159):FOR L=1 TO 29
    :FOR X=1 TO 4'KVVT
480 PRINT#4," [CMDR @8] ";:NEXT
    :PRINT#4:PRINT#4:NEXT
    :PRINT"[CLEAR]"'GKIR
485 GOSUB 1450:GOTO 140'CIYN
490 GOSUB 1430:PRINT"[CLEAR]"
    :OPEN 4,4,0:FOR M=1 TO 2
    :PRINT#4,CHR$(31):FOR X=1 TO
    2'LBQT
500 PRINT#4,"TO [CMDR @15] FROM
    [CMDR @14,SPACE2]";:NEXT X
    :PRINT#4'DHWX
510 PRINT#4,CHR$(14)+CHR$(31)'EKEE
520 PRINT#4,"WHILE YOU WERE OUT!
    WHILE YOU WERE OUT!"'BCVM
525 PRINT#4,CHR$(15):FOR X=1 TO 2'FKPL
530 PRINT#4,"M [CMDR @16] OF
    [CMDR @16,SPACE2]";:NEXT X'CFHB
535 PRINT#4:PRINT#4'CDJI
540 FOR X=1 TO 2:PRINT#4,"PH#
    [CMDR @14] EXT# [CMDR @14,SPACE2]
    ";'EHDC
545 NEXT X:PRINT#4'CDXJ
550 PRINT#4'BBDE
560 FOR X=1 TO 2:PRINT#4,"CALLED
    [SPACE2][], URGENT [],
     PLEASE CALL [],[SPACE2]";'EHHT
565 NEXT X:PRINT#4:PRINT#4'DFEM
570 FOR X=1 TO 2:PRINT#4,"MESSAGE
    [CMDR @30,SPACE2]";:NEXT X'FJMH
580 PRINT#4:PRINT#4,CHR$(159)
    :FOR Z=1 TO 8'GNLN
590 FOR X=1 TO 2:PRINT#4,"[CMDR @38,
    SPACE2]";:NEXT X'FJIM
595 PRINT#4'BBDN
600 PRINT#4:NEXT Z:PRINT#4:NEXT M
    :PRINT"[CLEAR]":GOSUB 1450
    :GOTO 140'HROI
610 GOSUB 1430:PRINT"[CLEAR]":OPEN 4,4
```

```
     :PRINT#4,CHR$(14)+CHR$(31)
     :FOR M=1 TO 19'KAVM
 62Ø PRINT"[CLEAR,RVS] SELECT COVER
     DESIGN, AND PRESS RETURN[SPACE2]"
     :PRINT'CBAO
 63Ø PRINT"[DOWN,RIGHT11,RVS]
      A=BASKETWEAVE ":PRINT"[RIGHT11,
     RVS] B=HEARTS[SPACE6]"'CBXO
 64Ø PRINT"[RIGHT11,RVS]
      C=X'S AND O'S ":PRINT"[RIGHT11,
     RVS] D=DIAMONDS[SPACE4]"'CBBP
 65Ø PRINT"[RIGHT11,RVS]
      E=PLAYING CARD":PRINT"[RIGHT11,
     RVS] F=CHECKER BRD."'CBNQ
 66Ø PRINT"[RIGHT11,RVS] G=BRICK WORK
     [SPACE2]":PRINT"[RIGHT11,RVS]
      H=MOSAIC TILE "'CBPR
 67Ø PRINT"[RIGHT11,RVS] I=GEOMETRIC
     [SPACE3]":PRINT"[RIGHT11,RVS]
      J=DIAGONALS[SPACE3]"'CBWS
 68Ø PRINT"[RIGHT11,RVS] K=DECO-ART I
     [SPACE2]":PRINT"[RIGHT11,RVS]
      L=DECO-ART II "'CBDT
 69Ø INPUT CV$'BDPK
 695 IF ASC(CV$)<65 OR ASC(CV$)>76 OR
     LEN(CV$)=>2 THEN PRINT"[UP2]"
     :CV$="":GOTO 69Ø'ODNF
 7ØØ PRINT:PRINT"[RIGHT11,DOWN,RVS]
      PRINTING...[SPACE2]";CV$
     :PRINT'DGXI
 71Ø IF CV$="A"THEN A$="[SHFT P]"
     :B$="[SHFT @]":N=9:PRINT#4,
     CHR$(14):GOTO 83Ø'JWMO
 72Ø IF CV$="B"THEN A$="[SHFT S]"
     :B$=" ":N=17:PRINT#4,CHR$(15)
     :GOTO 83Ø'JXPO
 73Ø IF CV$="C"THEN A$="X":B$="O":N=9
     :PRINT#4,CHR$(14):GOTO 83Ø'JWSP
 74Ø IF CV$="D"THEN A$="[SHFT N]"
     :B$="[SHFT M]":N=17
     :PRINT#4,CHR$(15):GOTO 83Ø'JXFR
 75Ø IF CV$="E"THEN A$="[SHFT A,SHFT S]
     ":B$="[SHFT Z,SHFT X]":N=9
     :PRINT#4,CHR$(15):GOTO 83Ø'JWBU
 76Ø IF CV$="F"THEN A$="[CMDR +]"
     :B$=" ":N=17:PRINT#4,CHR$(15)
     :GOTO 83Ø'JXYS
 77Ø IF CV$="G"THEN A$="[CMDR E]"
     :B$="[CMDR R]":N=17
     :PRINT#4,CHR$(15):GOTO 83Ø'JXCU
 78Ø IF CV$="H"THEN A$="[SHFT I,SHFT U]
     ":B$="[SHFT K,SHFT J]":N=9
     :PRINT#4,CHR$(15):GOTO 83Ø'JWLX
 79Ø IF CV$="I"THEN A$="[SHFT POUND]"
     :B$="[CMDR *]":N=9:PRINT#4,
     CHR$(14):GOTO 83Ø'JWSW
 8ØØ IF CV$="K"THEN A$="[SHFT V]"
     :B$="[SHFT +]":N=9:PRINT#4,
     CHR$(14):GOTO 83Ø'JWLO
 81Ø IF CV$="J"THEN A$="[SHFT @]"
     :B$="[SHFT O]":N=9:PRINT#4,
     CHR$(14):GOTO 83Ø'JWUP
 82Ø IF CV$="L"THEN A$="[CMDR *]"
     :B$="[SHFT POUND]":N=18
     :PRINT#4,CHR$(15):GOTO 83Ø'JXUQ
 83Ø PRINT#4,CHR$(31):FOR M=1 TO 19
     :FOR X=1 TO N:PRINT#4,A$;B$;
     :NEXT'KAGQ
 835 GOSUB 149Ø:PRINT#4'CGVM
 84Ø FOR X=1 TO N:PRINT#4,B$;A$;:NEXT
     :PRINT#4:NEXT:FOR X=1 TO 13
     :PRINT#4:NEXT'MYTS
 85Ø PRINT"[RVS] ENTER THE INSIDE
     MESSAGE,[SPACE3]"'BALO
 855 PRINT"[RVS] ONE LINE AND PRESS
     <RETURN> "'BATU
 86Ø GET A$:IF A$=""THEN 86Ø:PRINT'FJYM
 87Ø AN$=AN$+A$:PRINT A$;
     :IF A$="[POUND]"THEN A$="":AN$=""
     :GOTO 93Ø'JARU
 88Ø IF A$=CHR$(2Ø)THEN PRINT
     :PRINT"[RVS] RE-TYPE LINE ":A$=""
     :AN$="":GOTO 86Ø'JSRX
 89Ø IF A$=CHR$(13)THEN 91Ø'EJTP
 9ØØ GOTO 86Ø'BDNE
 91Ø PRINT#4,CHR$(15):KK=INT(52-(LEN
     (AN$)/2)):PRINT#4,SPC(KK),;AN$
     :PRINT#4'KJOR
 92Ø AN$="":A$="":GOTO 85Ø'DKWJ
 93Ø PRINT"[RVS] TYPE A ONE LINER ON
     BACK ? (Y/N) ":PRINT'CBTP
 94Ø GET A$:IF A$=""THEN 94Ø
     :IF A$<>"Y"THEN 96Ø'IOIP
 95Ø PRINT:INPUT"[RVS] WHAT IS THE
     CREDIT TO PRINT ";FF$
```

*Continued on pg. 124*

by David R. Brooks

# MIDI Programming, Part 2

## *Monitoring MIDI Information*

Have you bought a MIDI keyboard recently? I have—and the manual is over 200 pages long! Modern synthesizers are nothing more than complex special purpose computers, and their manuals are largely devoted to programming them from their control panels. This user-antagonistic arrangement is roughly comparable to programming a personal computer entirely in assembly language without the benefit of a high level language like BASIC. A reasonable solution is to place the burden of programming MIDI devices where it belongs—inside your computer. An essential first step toward this goal is to find an easy way to look at the MIDI data coming from the output ports of these music computers.

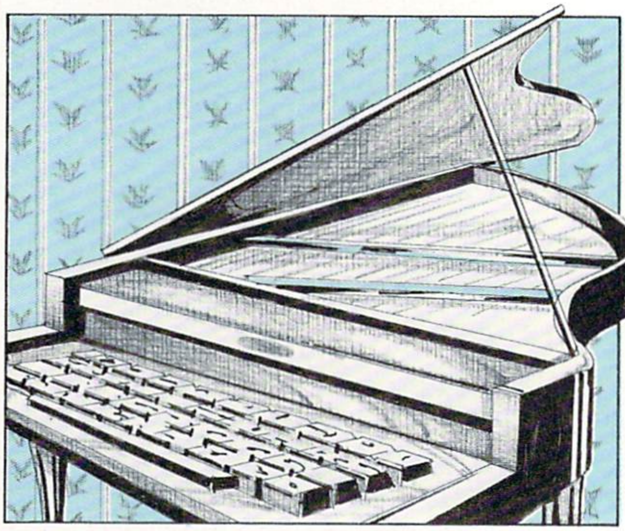
Even if you don't have any ambitions to write sophisticated music sequencing programs or keyboard sound editors, a MIDI hacking program will quickly give you some of the information you need to send appropriate commands to a MIDI device from commercial software. For example, my newest keyboard doesn't follow the simple MIDI-common protocol for changing sound parameters—it uses its own more complicated system-exclusive protocol. The easiest way to understand this protocol is to punch in the desired parameter changes on the keyboard's control panel and record the MIDI bytes the keyboard sends as a result.

In Part 1 of this article (*Commodore Magazine*, August, 1987), I showed you how easy it is to write a BASIC program for sending information to a MIDI-compatible device. I also noted that writing a program to receive MIDI information was not going to be equally easy. There are two problems that have to be taken care of before effective two-way communications can be established between your computer and a MIDI device.

First, the critical part of a program to receive MIDI data must be written in machine language. This is because MIDI devices send data at a fixed rate of one byte every 300 microseconds. Remember that even the simplest MIDI command, like turning a note on or off, requires more than one byte of information. When you send a command from your computer to a MIDI device, it will wait patiently for a meaningful string of bytes. However, when you receive data *from* a MIDI device, it will send the bytes at its fixed rate. What you do with them is your problem—the MIDI device doesn't care that your BASIC program can't keep up!

Second, a receiving program must know what to do with all possible types of MIDI data. When your program is sending MIDI data, you have control over that information, so you only have to understand the particular commands that you want to send.

Fortunately, the structure of MIDI data is straightforward. There are three kinds of information. Bytes with a decimal value of no more than 127 are data bytes. These include key numbers and key velocity values, for example. Bytes with a decimal value of more than 127 but less than 240 are called channel voice messages. These include note on/off, key pressure, control changes, program changes, channel pressure, pitch bend changes, and MIDI mode commands. Bytes with a value of 240 or more are system messages. All channel voice messages are



JOHN DZEDZY

typically followed by one or more data bytes.

A complete list of MIDI status bytes and their interpretation is given in Table 1. Some of these, like the note on and note off bytes, should be familiar from Part 1. The program I'm going to show you, called MIDIHacker, will interpret all these status bytes and print an explanatory message; you can learn to interpret the unfamiliar ones later. Note that not all possible byte values are currently defined in the MIDI standard. Future equipment may include additional commands that can easily be included in MIDIHacker's dictionary of known status bytes. Note also that channel voice messages must include the MIDI channel number; the channel number is usually identified as a number from 1 to 16, but when it is encoded into the channel voice status byte, it has a value from 0 to 15.

There are two kinds of MIDI information that I will choose to ignore. Why? Because to interpret them in a MIDI monitor program would quickly overwhelm the system. First, I will ignore MIDI timing clock information that is intended to control the timing of a computer and/or other MIDI devices. Second, I will ignore MIDI active sensing. Some MIDI devices send these bytes continuously even when nothing is happening, just so you will know that the device is on-line and connections have been properly made. Other than these exceptions, everything a MIDI device sends is of potential interest and should be accounted for.

Table 1 is extracted from the "MIDI 1.0 Detailed Specification," available from The International MIDI Association, 11857 Hartsook Street, North Hollywood, CA 91607. If you have any interest at all in MIDI equipment or programming, you should join this organization. It publishes a monthly newsletter of MIDI-related articles and equipment reviews, and is the definitive source of information about the evolving MIDI standard.

Now let's turn to the writing of MIDIHacker. Because the program includes a machine-language routine, it will work as given only for the Commodore 64. Basically, it needs to perform two tasks at the same time. The top priority job is to intercept, filter and store MIDI data. The second priority is to interpret the data. As mentioned above, the first job needs to be done in machine language. The second job can be done at a more leisurely pace from BASIC. The standard way to implement this kind of dual task is with a machine-language routine that adds the

time-critical tasks to the computer's normal hardware interrupt processing. You don't have to understand machine-language programming to use MIDIHacker because the necessary ma-

> Hook up a MIDI device and play one note. MIDIHacker will display NOTE ON and NOTE OFF messages on the screen.

chine-language instructions are stored in DATA statements and poked into memory with a loading routine at the start of the BASIC program.

The incoming stream of MIDI information is first intercepted by a hardware interface. These bytes can be unloaded in two ways. You can either ask the interface if it contains data at a particular time —this is called polling the interface—or you can cause the interface to generate a hardware interrupt whenever it has received a data byte. I use the second method for MIDI-Hacker for the simple reason that I can then use the standard technique of inserting my own interrupt-processing routine, as mentioned above.

The machine-language routine needs to analyze and store MIDI bytes very quickly. In this case, the analysis consists just of filtering out the MIDI clock and active sensing bytes. A good way of achieving efficient data storage is with what is called a first in/first out (FIFO) buffer. In MIDIHacker, I've kept things simple by restricting the length of this buffer, or storage area, to 255 bytes. This is the largest area that can be manipulated with one-byte indices. MIDI data will be stored in the FIFO buffer and then retrieved and interpreted from BASIC. In order to speed things up a bit, the program includes another machine-language routine to take care of emptying the buffer and keeping its indices (or pointers) updated. If too much data is coming into the interface, some of it may get destroyed before the BASIC program has a chance to look at it, but this is not a problem for simple MIDI setups, as you will see when you try the program.

Under some circumstances, it's possible for the computer to lose MIDI data if the device sending the data doesn't wait to make sure that existing data has been received. To prevent this, I've written the machine language so that once one MIDI byte is detected, the computer will not return to its normal interrupt processing until either the MIDI bytes stop or a MIDI clock or active sensing byte has been received. This may eventually cause some problems if the device is sending more than 255 bytes at one time.

I have written as much of MIDIHacker in BASIC as possible, including initialization of the interface. The program assumes you are using a disk drive so the required machine language can be poked from BASIC into the unused cassette buffer. However, the correct registers for Passport-type interfaces can be selected from the BASIC program, in which case the memory locations for the interface status and read registers are poked into the appropriate locations.

Extra care must be taken in the BASIC program if any changes are made to the machine code. Table 2 gives a listing of important variable names and memory locations, and indicates whether they are associated with the hardware interface or the machine-language routines. If you do make changes to the machine language, you will have to disassemble the new code and determine the proper addresses to use in the BASIC program.

**Table 1**
MIDI Channel and Status Byte Description

| Binary | Decimal | Status Byte Description | Followed By | Description |
|---|---|---|---|---|
| (System Common Channel Voice Messages) | | | | |
| 1000nnnn | 128+(0-15) | Note off | Okkkkkkk | Key number |
| | | | vvvvvvv | Key velocity |
| 1001nnnn | 144+(0-15) | Note on | Okkkkkkk | Key number |
| | | | Ovvvvvvv | Key velocity |
| 1010nnnn | 160+(0-15) | Key pressure | Okkkkkkk | Key number |
| | | | Ovvvvvvv | Pressure value |
| 1011nnnn | 176+(0-15) | Control change | Occccccc | Control number |
| | | | Ovvvvvvv | Control value |
| 1100nnnn | 192+(0-15) | Program change | Oppppppp | Program number |
| 1101nnnn | 208+(0-15) | Channel pressure | Ovvvvvvv | Pressure value |
| 1110nnnn | 224+(0-15) | Pitch blend | Olllllll | Low byte value |
| | | | Ohhhhhhh | Hi byte value |
| (System Common) | | | | |
| 1110000 | 240 | Start dump | | |
| (System Common Channel Mode Messages) | | | | |
| 11110001 | 241 | Undefined | | |
| 11110010 | 242 | Song pointer | Olllllll | Lo byte value |
| | | | Ohhhhhhhh | Hi byte value |
| 11110011 | 243 | Song select | Osssssss | Song number |
| 11110100 | 244 | Undefined | | |
| 11110101 | 245 | Undefined | | |
| 11110110 | 246 | Tuning request | | |
| (System Common) | | | | |
| 11110111 | 247 | End dump | | |
| (System Real Time Messages) | | | | |
| 11111000 | 248 | MIDI clock | | |
| 11111001 | 249 | Undefined | | |
| 11111010 | 250 | Start play | | |
| 11111011 | 251 | Continue play | | |
| 11111100 | 252 | Stop play | | |
| 11111101 | 253 | Undefined | | |
| 11111110 | 254 | Active sensing | | |
| 11111111 | 255 | System reset | | |

Note that the interface initialization, setup values, and memory locations are different for Sequential and Passport interfaces.

As with all programs that contain pokes and BASIC loaders for machine-language routines, you should check your work carefully and save a copy of the program before running it for the first time. Then if your computer crashes due to an error in the machine-language routine, you can start over again, reload the program, and edit it as appropriate. The FOR-NEXT loop that loads the machine language includes a checksum calculation that stops the program if the numbers included in the DATA statements don't add up to the expected value. However, it is still possible to have both a correct checksum and errors in the DATA statements, so be careful!

MIDIHacker is easy to use. Hook up a MIDI device to an ap-

propriate interface and run it. Try something simple like playing one note at a time. You should see NOTE ON and NOTE OFF messages appearing on the screen along with a channel number, key number, and key velocity. Many keyboards send on channel 1 as a default condition. If your keyboard doesn't send key velocity information, the velocity value should be 64. Note that some keyboards will respond to velocity data even if they don't send it. Consult your manual.

Many MIDI keyboards transmit in the running status mode, which means that after a status byte is sent to identify the kind of information to be transmitted, no more are sent until some other kind of information is transmitted. For example, if you press keys on such a device and hold them down, the note on status byte will be sent only once. Then, if you start releasing the keys one at a time, the note off status byte will be sent only once.

If you have one of the Casio CZ keyboards, you won't see any NOTE OFF messages at all. Instead, the Casio sends a note on command with a key velocity of 0. Thus, the Casio sends all information about key action in running status mode. This minimizes the amount of MIDI information that has to be sent, but at the expense of the more sophisticated computer software required to interpret the information. (There may be a MIDI standard, but not everybody implements it in exactly the same way!)

If your keyboard has a pitch bend or mod wheel, you should see other messages, depending on how the status of these wheels has been encoded. If you press other control buttons, you may or may not see MIDI bytes being transmitted; this depends entirely on the device and is just the kind of information MIDIHacker is intended to discover. Remember that there is not necessarily a 100% equivalence between what a keyboard transmits as MIDI data and what it will receive. MIDIHacker will be instructive, but it may not tell you everything you need to know about communicating with your keyboard.

Finally, note that the 255-byte buffer in MIDIHacker is large enough to hold a sound program dump from a variety of keyboards. This means that a simple extension of MIDIHacker, all of which can be done in BASIC, will enable you to store and reload your programmable sound patch cartridges. Unfortunately, the implementation, content and interpretation of program dumps differ from device to device.

**Table 2**

Important Variables and Locations Used in MIDIHacker

| Name or Location | Description |
|---|---|
| CR | (array) Control registers for Sequential and Passport MIDI interfaces |
| RS | (array) Reset values for Sequential and Passport interfaces |
| IN | (array) Enable MIDI hardware interrupts for Sequential and Passport interfaces |
| 251,252 | Lo and hi bytes for buffer address (unused zero-page locations) |
| 826,827 | Buffer pointer addresses (program-specific) |
| 788,789 | 64 system address for interrupt vector |
| BU=866 | Location of machine-language routine to get MIDI data (program-specific) |
| MB=825 | Location of current MIDI byte (program-specific) |
| 56333 | 64 system address for turning interrupts on/off |

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

**MIDIHacker**

```
40 DIM ST$(17)'BHKC
50 FOR I=1 TO 17:READ ST$(I):NEXT'FMEG
60 CK=0:REM INITIALIZE CHECKSUM'CWAJ
70 FOR I=828 TO 909:READ X:POKE I,X
   :REM POKE ML ROUTINE'GCJN
80 CK=CK+X'CFHG
90 NEXT'BAEF
100 REM IFCK<>8940THENPRINT"ERROR IN
   ML DATA STATEMENTS":STOP'BYTJ
110 INPUT"[RVS]S[RVOFF]EQUENTIAL OR
   [RVS]P[RVOFF]ASSPORT INTERFACE";
   WH$'BERH
120 IF WH$="S"THEN WH=1:GOTO 160'FKOC
130 IF WH$="P"THEN WH=2:POKE 832,8
   :POKE 832,9:GOTO 160
   :REM PASSPORT REGISTERS'IPSN
140 PRINT"INPUT ERROR. TRY AGAIN..."
   :GOTO 110'CEXH
150 REM SETUP AND INITIALIZATION FOR
   SEQUENTIAL AND PASSPORT
   INTERFACES'BGWR
160 CR(1)=56832:CR(2)=56840
   :REM CONTROL REGISTERS'DNAM
170 RS(1)=3:RS(2)=19:REM MASTER
   RESET'DBLK
180 IN(1)=149:IN(2)=145
   :REM RECEIVE INTERRUPTS'DKTN
190 BU=866   :REM LOCATION OF ML
   ROUTINE TO GET DATA'CJAP
200 MB=825   :REM LOCATION OF CURRENT
   MIDI BYTE'CGRG
210 REM *** INITIALIZE ***'BQYB
220 POKE 251,0:POKE 252,192
   :REM POKE LO,HI BYTES OF START OF
   BUFFER (49152)'DAQM
230 POKE 826,0:POKE 827,0
   :REM STORE STARTING VALUES OF
   BUFFER POINTERS'DWGN
240 POKE CR(WH),RS(WH):REM MASTER
   RESET'CATH
250 POKE CR(WH),IN(WH):REM RECEIVE
   INTERRUPTS FROM MIDI'COSN
260 POKE 56333,127:REM DISABLE
   INTERRUPTS'CCLK
270 POKE 788,60:POKE 789,3
   :REM STORE ADDRESS OF NEW
   INTERRUPT ROUTINE'DVRR
280 POKE 56333,129:REM RESTORE
   INTERRUPTS'CCLM
290 REM *** READ MIDI DEVICE ***'BUVK
300 PRINT"[CLEAR]NOW LISTENING FOR
   MIDI DATA."'BAIF
310 PRINT"PRESS [RVS]SPACEBAR[RVOFF]
    TO QUIT..."'BAQF
```

```
320 GET A$:IF A$=CHR$(32)THEN END
    :REM STOP IF SPACEBAR PRESSED'HGWL
330 SYS BU:B=PEEK(MB)'DIFE
340 IF B<128 THEN PRINT B;:GOTO 320
    :REM <128 FOR DATA BYTES'GCML
350 IF B=254 THEN 320:REM END'ELUG
360 PRINT'BACD
370 IF B>239 THEN 420:REM <240 FOR
    CHANNEL MESSAGES'EFSO
380 T=((B AND 112)/16)+1
    :CH=(B AND 15)+1'HVWO
390 PRINT ST$(T);", CH #";CH;'BLXK
400 GOTO 320'BDEY
410 REM SYSTEM MESSAGES'BODD
420 IF B=240 THEN PRINT ST$(8);
    :GOTO 320'FPJG
430 IF B=242 THEN PRINT ST$(9);
    :GOTO 320'FPMH
440 IF B=243 THEN PRINT ST$(10);
    :GOTO 320'FQDI
450 IF B=246 THEN PRINT ST$(11);
    :GOTO 320'FQHJ
460 IF B=247 THEN PRINT ST$(12);
    :GOTO 320'FQJK
470 IF B=250 THEN PRINT ST$(13);
    :GOTO 320'FQEL
480 IF B=251 THEN PRINT ST$(14);
    :GOTO 320'FQGM
490 IF B=252 THEN PRINT ST$(15);
    :GOTO 320'FQIN
500 IF B=255 THEN PRINT ST$(16);
    :GOTO 320'FQMF
510 PRINT ST$(17);:GOTO 320'CMAD
520 DATA"NOTE OFF","NOTE[SPACE2]ON",
    "POLY PRESSURE","CONTROL
    CHANGE"'BDCO
530 DATA"PROGRAM CHANGE",
    "CHANNEL PRESSURE",
    "PITCH BEND"'BCHO
540 DATA"SYSEX START","SONG POINTER",
    "SONG SELECT","TUNING
    COMMAND"'BDAS
550 DATA"SYSEX END"'BAEH
560 DATA"START","CONTINUE","STOP",
    "RESET","UNDEFINED"'BEJP
570 DATA 72,152,72,173,2,222,74,
    176'BBPL
580 DATA 3,76,92,3,173,3,222,201'BXKL
590 DATA 254,240,13,201,248,240,9,
    141'BDAN
600 DATA 56,3,32,122,3,76,63,3'BVNE
610 DATA 104,168,104,76,49,234,173,
    58'BDAG
620 DATA 3,205,59,3,208,6,169,254'BYTH
630 DATA 141,57,3,96,168,177,251,
    238'BCFI
640 DATA 58,3,141,57,3,96,172,59'BXDJ
650 DATA 3,200,152,136,205,58,3,
    240'BBWK
660 DATA 3,141,59,3,173,56,3,145'BXSK
665 DATA 251,96'BGGM
60000 OPEN 15,8,15,"S0:MIDIHACKER"
      :CLOSE 15:SAVE"0:MIDIHACKER",
      8'DOWB
```

END

by Paul Higginbottom

# C Tutorial, Part 6

## Get to know the C language in this series by programmer Paul Higginbottom.

At the end of the last article was a string copying function, and I asked you to write an improved version. The original function is shown below.

```
void strcpy(to, from)
char *to, *from;
{
 while (*from != '\0') {
  /* while there are more characters in the string */
  *to = *from;  /* copy it */
  ++to;     /* advance both pointers to the next char */
  ++from;
 }
 *to = '\0';     /* terminate the destination string */
}
```

Its purpose is to copy a string of characters ending in the nul (\0) character and pointed to by the "from" pointer into memory pointed at by the "to" pointer. I shall, by the way, be devoting quite a bit of my articles to textual manipulation, since it is the basis of most useful programs (databases, word processors, spread-sheets, etc.)

Moving on to an improved strcpy function. The current algorithm is broken down into two steps.

- Keep copying while not at the end of the source string.
- Terminate the new destination string.

Step 1 is done in three parts.

- While the pointer to the source string has not reached the end, perform the next two routines (otherwise, go to step 2).
- Copy one character from the source string into the destination string.
- Increment the source and destination pointers (go back to the first part of step 1). The comments in parentheses are for added clarity. Their instruction is implied.

One easy but subtle step is to combine the last two parts of step 1. Pointers, like any variables, can be manipulated before or after their values have been used in an expression with the + + and —operators (see article on operators). So

```
*to = *from;
++to;
++from;

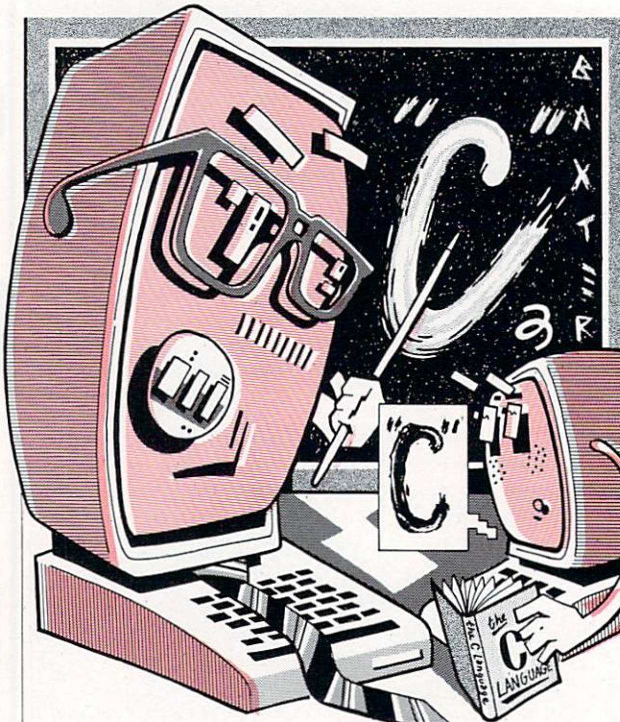
Can be replaced by:

 *to++ = *from++;
```

which means "copy a char from 'from' to 'to' and increment both pointers afterward." Isn't that nicer? It isn't weird if you know C—it still displays what it does. This is unlike a language like APL when even if you know the language very well, it is often very unclear what a small line of code does. Granted, C can be written this way, but the above shows how a number of operations can be combined into text that is compact, yet easy to follow.

The strcpy function now looks like:

```
void strcpy(to, from)
char *to, *from;
{
 while (*from != '\0') {
  /* while there are more characters in the string */
  *to++ = *from++; /* copy it and advance both pointers */
 }
 *to = '\0';     /* terminate the destination string */
}
```



ART BAXTER

Note that step 2 would be eliminated if the nul were somehow copied before testing to see if the end of the source string had been reached. This can be accomplished in the "while" test as follows.

```
void strcpy(to, from)
char *to, *from;
{
 while ((*to++ = *from++) != '\0') ;
}
```

First of all, note that the body of the loop doesn't need to do anything because everything is accomplished in the assignment and test. But it is still necessary to specify that no statements are to be performed each time through the loop. This can be done as above with just a semi-colon or by a block with no statements in it (just an open and close brace "{}").

Second, in C, actual assignments can become part of a test. Note, however, the parentheses separating the assignment from the test. If they were not present, the precedence of operators (the order in which things are evaluated) would give the wrong result. It would cause *to to become assigned with the value *from != \0 which is 0 if *from is not equal to \0 and a non-zero value if it is equal. The value of that expression is equal to the truth or falsehood of the test. Similarly, an assignment has an overall value. The value of an assignment is the value given to the left hand side. For example,

```
if (a = 1) {
 printf("a is true\n");
}
else {
```

```
  printf(a is false\n");
}
```

The above will print that a is true because a is assigned with the value 1 and the value of a = 1 which as tested is 1, which is non-zero and therefore true.

But wait! Strcpy can be simplified still further because of the value of assignments. The nul character at the end of a string is numerically zero and, therefore, if the value of the current character being copied is tested after being copied, it will fail where we want, when it reaches the nul. Thus,

```
void strcpy(to, from)
char *to, *from;
{
 while (*to++ = *from++) ;
}
```

Here's a BASIC equivalent which copies an array of integers up to a zero.

```
900 I=0
910 B(I)=A(I)
920 IF A(I)=0 THEN RETURN
930 I=I+1
940 GOTO 910
```

Maybe this comparison gives you an idea of the compactness without loss of clarity that C can provide.

## Pointer Arithmetic and Arrays One More Time

Last article I went over the differences and similarities between the way arrays and pointers are used and treated, but I'd like to expand on that still further.

An array is basically nothing more (as far as the compiler is concerned) than a pointer to the start of some memory that will be treated like a contiguous block of variables of the same type. There is not, for example, any checking of the legality of subscripts! Consider the following.

```
main()
{
 char bigstring[80];
 char c;

 c = bigstring[90];
}
```

The above will compile without any warnings or errors using most compilers. There is a program on UNIX systems called lint, named, I believe, because it will pick out all the fluff in your program. Lint may well point out to you the potentially disastrous nature of the above program, but most of you won't have that utility available.

It is worth repeating again that your program will internally reference bigstring[90] by getting the address of the start of the bigstring array, and addint 90 x (how much memory it takes to store a char).

That's all subscripting a pointer does. A declared array is, as I stated before, basically a pointer that you can't change the value of. But due to this simplicity, you can also use subscripts on any pointer. If you want the fifth character beyond where character pointer cp points to, it is perfectly legal to use cp[5]. If you want the address of that character, you can use the ampersand (&) operator; for example, &cp[5]. Alternatively (!), you can say &(cp + 5). This will work because adding a constant to a pointer yields a pointer offset by the constant multiplied by the size of the object pointed to. Yes, note the similarity between what you just read and array subscripts—yes, it is the same. To get the fifth character beyond where cp points to, both of

1) cp[5] and
2) *(cp + 5)

are legal, normal and useful. The only difference is (obviously) syntax.

Different circumstances usually lean a programmer toward using one style over the other. I, personally, would use subscripting (with square brackets) when I am using a declared array. Otherwise, I would use syntax number 2. That way, it is implied to my brain whether I'm dealing with an array I declared, or a pointer to somewhere.

Obviously, another important way to distinguish for yourself whether you are using pointers or array names is the names themselves. If you call a pointer "string," I have no sympathy for you! Calling it charpointer or strptr or cp (for character pointer) or any of a thousand variants will all help you know what context you're in.

I wanted to get this clarification about pointers vs. arrays through now because it's something that didn't click for me for a long time.

## Libraries

Before we go any further, you may be thinking that C has very few built-in capabilities, and that it looks like you're going to have to write everything yourself. That is (fortunately) not so. With all C compilers, you get one or more libraries of completed and (hopefully) well documented routines that you can use. If you have been compiling programs before this point, you probably already know that converting a C source file (your written

program) into something you can run usually takes at least two steps.

1) Compile the program into an object code file.
2) Link the object code file with one or more supplied libraries and maybe other object code files to produce an executable program, or something you can run.

These linkable libraries usually contain a standard set of functions to manipulate strings, perform all peripheral input and output, format numbers, and more.

From now on, examples may need to refer to functions that will not be shown, but are assumed to be available to you in a library. The nature of what the unseen function(s) is/are supposed to do will be explained, of course.

## Call by Value, Not Reference

When a variable's value is passed as a parameter to a function, the value is used by the function, but that function cannot change the variable in the function which called it. This is call by value. Call by reference, on the other hand, would mean that a variable's reference (its address) would be passed instead of its value and, therefore, the function being called can modify the variable because it knows where it is stored in memory. Here's an example.

```
main()
{
 int i;

 i = 5;
 fooey(5);
}

fooey(i)
int i;
{
 i *= 10;
 printf("fooey's i = %d\n", i);
}
```

The above code deliberately uses the same name for the variable being passed in main(), as the variable that receives the value in fooey(), namely i.

When i is modified in fooey(), main()'s i is not affected, because only the value of i in main() was passed to fooey(). Fooey() does not know where main()'s i is stored and, therefore, cannot change it.

But we now know from our pointer experience that we can get the address of a variable via the ampersand operator (&). No one said pointers and addresses had to be only for characters as has been the case in the previous examples. If a function passes the address of a variable, the function being called must receive that value (an address) into a pointer variable of the same type as the referenced variable in the caller. (All these words, where so little code will explain it more clearly!)

```
main()
{
 int i;

 i = 5;
 fooey(&i); /* pass i's address */
}

fooey(iptr)
int *iptr;
{
 *iptr *= 10;
 printf("the modified i is now = %d\n", *iptr);
}
```

In the above example, main() passes the address of i to fooey() instead of the value of i, thereby allowing fooey() to modify the variable i.

Note that fooey() references i's value by indirecting through the pointer via the asterisk (*). Everywhere there is a *iptr, you can visualize main's ordinary integer variable 'i'.

Moving on to something more useful and, naturally, a little more complex, suppose that we have a program which reads in a line of text at a time from the user and wishes to find the first word in that line. To do that, it must skip any white space characters first. White space characters are characters which advance the cursor (or printhead on a printer) but do not render (draw) anything on the screen (or paper). Examples are a tab, a newline, a line feed, a carriage return, and a space.

To accomplish the goal, the program will have a function which, when given the address of an index into the line buffer, will advance that index beyond any white space.

```
/* make the line buffer global to avoid
   lots of parameter passing */

char linebuffer[80];

main()
{
 extern void skipwhitespace();
 /* this doesn't return anything */

 int index;

 gets(linebuffer);      /* input a line of text */
 index = 0;         /* start at the beginning */
 skipwhitespace(&index);  /* skip over any white space */
 printf("%s\n", &linebuffer[index]);
 /* print text beyond white space */
}

void skipwhitespace(iptr)
int *iptr;
{
 while (linebuffer[*iptr] != '\0') {
  /* while not at end of string */
  switch(linebuffer[*iptr]) {
   case '\t': /* skip these... */
   case '\n':
   case ' ':
    break;
   default:
   /* must have found something which isn't white space */
    return; /* exit stage left... */
  }
  ++(*iptr); /* advance index */
 }
}
```

The above program should be fairly straightforward to follow. A new function gets() is used to input a line of text from the keyboard. This is a routine that should be provided with your compiler in a library of routines. It reads characters from the keyboard, allowing whatever editing your system allows, and places the line of text in the buffer specified. The newline (carriage return) is not placed in the buffer, usually. Instead, the string is terminated with a \0 (nul) to make it a normal C string.

In the skipwhitespace() function, note the need for parentheses around *iptr when advancing the index at the bottom of the loop. They are needed because what iptr points to must be incremented, and not iptr itself.

We have now covered more ground on the use of pointers and, by now, you should be able to write some useful C programs which can manipulate memory (for example, a character or bit-graphics mapped screen), and handle simple screen and keyboard input and output. We have yet to cover file input and output, and another important variable type, the structure.

As a test, try to modify the program which uses the skipwhitespace() function to count the number of words entered, and print that number. That will require alternately skipping whitespace, and then tracking non-whitespace to determine where words start and end. As a real challenge, you might want to print the individual words out, each on a separate line. ■

by Jerome E. Rueter

# Envelope Master

*for the Commodore 64 and 128*



BOB CLARK

**For all of the DPS (and compatible daisy wheel) owners that can't run many popular printer programs, this program is for you.**

There are two things that are as sure as death and taxes: most word processors and printers can produce much more professional looking letters or reports than a person can produce by hand, and the the majority of your home letter writing gets printed out very neatly then put into a hand-written envelope.

But don't feel alone if you think that label printing programs just don't fit the bill for those single jobs. What we need is a program that will take any size envelope and type out the return and main addresses—and do it fast. This program is Envelope Master.

When you run Envelope Master, you will be asked for your envelope's height and width. This information is always on the envelope box, but for cards you will have to use a ruler. A chart for converting fractions to decimal is provided to aid you in entering your sizes in decimal. The next line will ask you for the return address name. If you have entered your own information in subroutine 760, just enter d1 (for default #1) and press RETURN. The information from subroutine 760 will be displayed for confirmation. Press RETURN if the information is correct and you are off to the main address inputs.

You may have a d2 (for default #2) if you have two different formats for your address. Enter the d2 information in subroutine 790. The addressee name prompt works the same way. Enter the information in subroutine 820 and the d2 information in subroutine 850.

Note that you can include a dozen names and addresses in the same manner if you want to. First, add the information in subroutine 871, using the above routine as a guide, then add the branch line 281 IF TN$="D3" THEN GOTO 871. My original copy of this program has 15 addresses and still runs fast.

After the name and address prompts have been entered or defaulted, the program allows you to add a flag line or whatever you want without using line deliminators.

The last input is "Which Printer?" This line has a blinking DPS for the DPS-1101 printer. All you have to do is press RETURN. The manual for the DPS-1101 will allow the printer to be used for envelope printing with switch 1 of dip switch 2 in the off position. This is the normal position for the impression level switch.

The program will run on the MPS printers by changing the DPS prompt to MPS and pressing RETURN. Be careful—the owner's manual for my MPS-1000 states that the maximum is two sheets of paper. A standard envelope will exceed this maximum thickness (.005) by about 20-30%. If your model of MPS allows thicker paper or you have thin envelopes, change the DPS response to MPS and press RETURN.

I have measured a vast array of products for the printers, including the envelopes with tear-off tractor strips and index file cards produced the same way, which all exceed the limit set for the MPS-1000. Should you put envelopes in the MPS-1000? That decision is up to you. For all of the DPS (and compatible daisy wheel) owners that can't run many of the popular printer programs, this program is for you.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

### Envelope Master

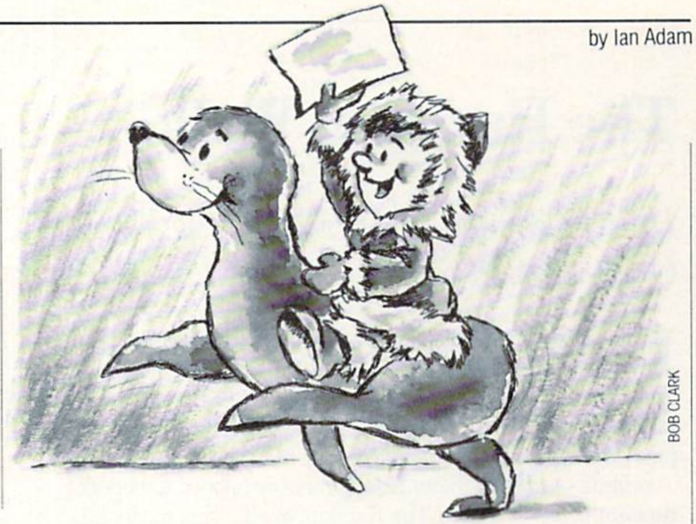
```
10 POKE 53280,7:POKE 53281,7
   :PRINT"[CLEAR,BROWN]"
   :DIM A$(7)'EWUE
20 PRINT TAB(11)"[DOWN2,RVS]
    ENVELOPE MASTER [RVOFF]"'CDMF
25 PRINT TAB(7)"[DOWN2]
   FOR COMMODORE C64 OR C128"'CCLL
30 PRINT TAB(18)"[DOWN2]BY"
   :PRINT TAB(11)"[DOWN2]
   JEROME E. REUTER"'EHKI
40 PRINT"[DOWN3]MAGAZINE: COMMODORE"
   :PRINT"[DOWN2]ISSUE: XX/87"
   :PRINT"[DOWN2]PAGE: XXX"'DCNN
50 FOR X=1 TO 3000:NEXT'EHWE
60 PRINT"[CLEAR]":PRINT TAB(8)"[RVS]
    DECIMAL EQUIVELENTS [RVOFF]"
   :PRINT'EEYM
70 FOR X=1 TO 7:READ A$(X):NEXT X'FLVI
80 FOR X=1 TO 7:SIZE=SIZE+.125
   :PRINT TAB(14)A$(X);"=";SIZE
   :NEXT X'IIAR
90 PRINT"[DOWN2]CHECK TO SEE IF
   ENVELOPE SIZE IS PRINTED"'BAPQ
100 PRINT"ON THE BOX. IF NOT,
     MEASURE AND CONVERT"'BAXF
110 PRINT"THE FRACTION TO A DECIMAL
    THEN:"'BAWE
120 INPUT"[DOWN]ENTER THE ENVELOPES
    HEIGHT";EH'BDHF
130 INPUT"[DOWN]ENTER THE ENVELOPES
    WIDTH";EW'BDOG
140 PRINT"[CLEAR,RVS,SPACE2]
    REM ANSWER D1 OR D2 FOR THE
    DEFAULTS[SPACE2]"'BACK
150 INPUT"[DOWN2]FROM (NAME)";RN$'BERE
160 IF RN$="D1" THEN GOTO 760'EGSF
170 IF RN$="D2" THEN GOTO 790'EGWG
180 PRINT"[HOME,SPACE40]"'BAVI
185 FOR X=1 TO 4:PRINT:NEXT'FFJM
190 INPUT"FROM (ADDRESS)";RA$
    :INPUT"FROM (CITY)";RC$'CJBN
200 INPUT"FROM (STATE)";RS$
    :INPUT"FROM (ZIP)";RZ$'CJLF
```

```
210 PRINT"[CLEAR]":PRINT:PRINT RN$
    :PRINT RA$:PRINT RC$;", ";RS$
    :PRINT RZ$'GWTG
220 INPUT"[DOWN2]IS THIS CORRECT
    (Y/N)[RIGHT4]Y[LEFT3]";AN$'BEMH
230 IF AN$="Y" THEN 250'DGKC
240 IF AN$<>"Y" THEN 140'EGFE
250 PRINT"[CLEAR,RVS,SPACE2]
    REM ANSWER D1 OR D2 FOR THE
    DEFAULTS[SPACE2]"'BACM
260 INPUT"[DOWN2]TO (NAME)";TN$'BEDF
270 IF TN$="D1" THEN GOTO 820'EGRH
280 IF TN$="D2" THEN GOTO 850'EGVI
290 PRINT"[HOME,SPACE40]"'BAVK
295 FOR X=1 TO 4:PRINT:NEXT'FFJO
300 INPUT"TO (ADDRESS)";TA$
    :INPUT"TO (CITY)";TC$'CJRF
310 INPUT"TO (STATE)";TS$
    :INPUT"TO (ZIP)";TZ$'CJDG
320 PRINT"[CLEAR]":PRINT:PRINT TN$
    :PRINT TA$:PRINT TC$;", ";TS$
    :PRINT TZ$'GWEI
330 INPUT"[DOWN2]IS THIS THE CORRECT
    ONE (Y/N)[RIGHT4]Y[LEFT3]";
    AN$'BEVL
340 IF AN$="Y" THEN GOTO 360'EGTF
350 IF AN$="N" THEN GOTO 250'EGGG
360 PRINT"[CLEAR]"'BATE
370 PRINT"[DOWN2]IS THERE A LOWER
    FLAG TO THE ADDRESS"'BAHO
380 PRINT"[DOWN]EXAMPLE
    : PHOTOGRAPHS-DO NOT BEND"'BAIO
390 INPUT"[DOWN](Y/N)[RIGHT2]N[LEFT3]
    ";AF$'BELL
400 IF AF$="N"THEN 420'DGPB
410 INPUT"[DOWN]WHAT IS THE MESSAGE";
    FLAG$'BGCG
420 PRINT"[CLEAR]"'BATB
430 PRINT"[DOWN2]INSERT[SHFT SPACE]
    THE";EH;"X";EW;"ENVELOPE,"'BICK
440 PRINT"[DOWN]TURN ON PRINTER AND
    PRESS <RETURN>"'BARM
450 GET A$:IF A$=""THEN 450'EIIH
460 IF A$<>CHR$(13) THEN 450'FJQJ
470 OPEN 15,4,15:CLOSE 15'CKEI
480 IF ST<>0 THEN PRINT"[DOWN]
    THE PRINTER DOES NOT RESPOND ..."
    :GOTO 440'GHRT
490 OPEN 10,4,10:PRINT#10
    :CLOSE 10'DNPL
500 INPUT"[DOWN2]WHICH PRINTER ARE
    YOU USING[RIGHT4]DPS[LEFT5]";
    PR$'BEOM
510 IF PR$="DPS" THEN ADJ=1'EHTF
520 IF PR$="MPS" THEN ADJ=-2'FHAG
530 OPEN 4,4'BDAD
540 PRINT#4,SPC(1);RN$'CIVF
550 PRINT#4,SPC(1);RA$'CIIG
560 PRINT#4,SPC(1);RC$;", ";RS$'CNTJ
570 PRINT#4,SPC(1);RZ$'CIDJ
580 GOSUB 880:REM CALCULATE DOWN TO
    ADDRESS'CBAP
590 FOR X=1 TO DA:PRINT#4:NEXT X'FIEM
600 GOSUB 900:REM GET LONGEST
    STRING'CUSG
610 GOSUB 930:REM CALCULATE
    SPC(#)'CTRG
620 PRINT#4,SPC(X);TN$'CIGF
630 PRINT#4,SPC(X);TA$'CITG
640 PRINT#4,SPC(X);TC$;", ";TS$'CNMI
650 PRINT#4,SPC(X);TZ$'CISI
660 IF AF$="Y"THEN GOSUB 950
    :REM CALCULATE LINES DOWN'FAEQ
670 FOR X=1 TO DN:PRINT#4:NEXT X'FIMM
680 GOSUB 960:REM CALCULATE SPC(X) TO
    CENTER UP FLAG$'CJNS
690 PRINT#4,SPC(X);FLAG$'CKBM
700 INPUT"[CLEAR,DOWN2]PRINT ANOTHER
    [RIGHT4]Y[LEFT3]";AN$'BEEJ
710 IF AN$="N"THEN GOTO 750'EGLG
720 INPUT"[DOWN2]SAME ADDRESSES
    [RIGHT4]Y[LEFT3]";AN$'BEUL
730 IF AN$="Y"THEN CLOSE 4
    :GOTO 490'FILJ
740 CLOSE 4:RUN'CCBG
750 PRINT#4:CLOSE 4:END'DEWI
760 REM DEFAULT RETURN ADDRESS #1'BWFN
770 RN$="COMMODORE MAGAZINE"
    :RA$="1200 WILSON DRIVE"
    :RC$="WEST CHESTER"'DLUA
780 RS$="PA.":RZ$="19380"
    :GOTO 210'DLNP
790 REM DEFAULT RETURN ADDRESS #2'BWGQ
800 RN$="MR.& MRS. C.C. USER"
    :RA$="405 YOUR STREET"
    :RC$="ANYTOWN"'DLOR
810 RS$="YOUR STATE":RZ$="XXXXX"
    :GOTO 210'DLQM
820 REM DEFAULT (TO) ADDRESS #1'BUAJ
830 TN$="COMMODORE MAGAZINE"
    :TA$="1200 WILSON DRIVE"
    :TC$="WEST CHESTER"'DLBW
840 TS$="PA.":TZ$="19380"
    :GOTO 320'DLTM
850 REM DEFAULT (TO) ADDRESS #2'BUBM
860 TN$="XXXXXXXXXXXXXXXXX"
    :TA$="XXXXXXXXXXXXXXX"
    :TC$="XXXXXXXXXX"'DLQD
870 TS$="XXXXXXXXXXXXXXXXXX"
    :TZ$="XXXXX":GOTO 320'DLJV
880 DA=INT((EH*6)/2)-6:IF DA<1 THEN
    DA=0'JSXT
890 RETURN'BAQL
900 AC=LEN(TN$):IF LEN(TA$)>AC THEN
    AC=LEN(TA$)'IWDN
910 IF LEN(TC$)+LEN(TS$)+2>AC THEN
    AC=LEN(TC$)+LEN(TS$)+2'MBFS
920 RETURN'BAQF
930 X=INT((EW*10)/2)+ADJ-(AC/2)
    :IF X<1 THEN X=0'LXMS
940 RETURN'BAQH
950 DN=INT(DA*.6):RETURN'EJQM
960 X=INT((EW*10)/2)+ADJ-(LEN(FLAG$)
    /2):IF X<1 THEN X=0'MDMX
970 RETURN'BAQK
980 DATA "1/8","1/4","3/8","1/2",
    "5/8","3/4","7/8"'BGYQ
```

END

by Ian Adam

# Teletype Message
*for the Commodore 64 and 128*




Message now coming in on the teletype from our northern outpost:

"Simulate output from a teletype or telegram terminal with this handy subroutine. Stop. Just set M$ to the message you want to send, then GOSUB 1000 to print it automatically. Stop. The message may contain cursor movement characters, color controls, or anything else that can be printed legally. Stop. Use this in your Commodore 64 or 128 programs for added interest. Stop."

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

### Teletype Message 64

```
10 POKE 53281,0'BHUX
20 M$="[L. RED,SHFT T,SHFT E,SHFT L,
   SHFT E,SHFT T,SHFT Y,SHFT P,SHFT E,
   SHFT SPACE]64"'BCIH
30 GOSUB 1000'BECA
40 PRINT'BACA
50 M$="[L. BLUE,SHFT A]
    SNAPPY WAY TO [SHFT P,SHFT R,
   SHFT I,SHFT N,SHFT T] YOUR MESSAGE,
   [SPACE2,YELLOW]IN FULL COLOUR,
   "'BCCU
60 M$=M$+" [WHITE]FOR MAXIMUM
   EFFECT."'CEWJ
70 GOSUB 1000'BECE
80 END'BACE
90 :'ABHF
1000 POKE 54273,99:POKE 54278,250'CSPW
1010 POKE 54276,129'BJCV
1030 FOR I=1 TO LEN(M$)'EGNY
1040 PRINT"[RVS] [RVOFF,LEFT]";'BBEY
1050 FOR J=1 TO 19 :NEXT'EFTB
1060 POKE 54296,15'BIAB
1070 PRINT MID$(M$,I,1);'CJYD
1080 POKE 54296,0'BHCC
1090 NEXT:PRINT'CBJD
1100 POKE 54276,32: POKE 54296,15'CRGX
1110 FOR J=1 TO 299 :NEXT'EGCX
1120 POKE 54276,0: POKE 54296,0'CPYA
1130 RETURN'BAQW
```

END

### Teletype Message 128

```
10 COLOR 0,1'BDPX
20 M$="[L. RED,LOWER CASE,SHFT T,
   SHFT E,SHFT L,SHFT E,SHFT T,SHFT Y,
   SHFT P,SHFT E,SHFT SPACE]128"'BCWH
30 GOSUB 1000'BECA
40 PRINT'BACA
50 M$="[L. BLUE,SHFT A]
    SNAPPY WAY TO [SHFT P,SHFT R,
   SHFT I,SHFT N,SHFT T] YOUR MESSAGE,
   [SPACE2,YELLOW]IN FULL COLOUR,
   "'BCCU
60 M$=M$+" [WHITE]FOR MAXIMUM
   EFFECT."'CEWJ
70 GOSUB 1000'BECE
80 END'BACE
90 :'ABHF
1000 TEMPO 255'BEIT
1010 FOR I=1 TO LEN(M$)'EGNW
1020 PRINT"[RVS] [RVOFF,LEFT]";'BBEW
1030 FOR J=1 TO 29 :NEXT'EFUY
1040 PLAY"T3O5A"'BBHY
1050 PRINT MID$(M$,I,1);'CJYB
1060 NEXT'BAEY
1070 FOR J=1 TO 99 :NEXT'EFCD
1080 PRINT CHR$(7)'CDGC
1090 RETURN'BAQC
```

END

by Roger S. Macomber

# The Random Walk

*or*

## *How I Learned to Appreciate the Value of Organization for the Commodore 128*

It has been said that if you placed a monkey in front of a typewriter and let him go at it, someday he will have typed all the great novels ever written. The point of this argument is that, *given enough time*, even the most complex tasks can be accomplished through random happenings.

Scientists and mathematicians have developed a model of random behavior called The Random Walk. This model has been applied to many problems—from the behavior of atoms in a gas to the behavior of people in a crowd. By comparing the results of an experiment to the predictions of The Random Walk, one can decide if the outcome of the experiment is truly governed by random occurences, or whether there is, somewhere, a cause-and-effect relationship.

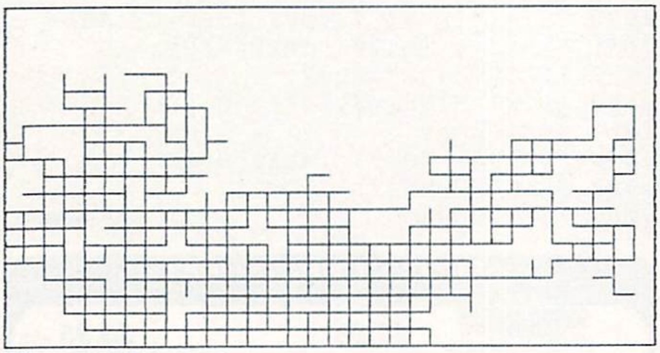


**Figure 1 Midway through the random walk**

The Random Walk can take place in one, two, three, or even more dimensions. Let's focus our attention on a two-dimensional random walk. Suppose you are in the center of a strange city where all the streets run north/south or east/west, forming a highly regular grid pattern. You decide to explore the city, but since you know nothing about it, you decide to take a random walk through it. At each intersection you will randomly choose which compass direction (north, south, east or west) to walk. You'll walk in this direction for one block, then pick a new direction.

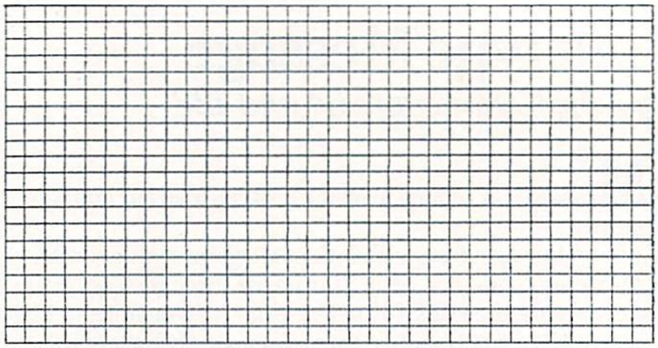


**Figure 2 The completed random walk**

Just how to pick a direction at random requires some ingenuity. Perhaps you could write the four cardinal directions on four business cards and pull them out of your pocket unseen. Or, if you want to risk getting arrested, you could ask passers-by to pick a card. But the whole point is, will this be an efficient way to see the city?

Random Walk demonstrates the outcome of a two-dimensional random walk. Enter the program, DSAVE it, then run it. Starting in the middle of your high-resolution graphics screen (with your 1902 monitor in the CVBS mode), the explorer will choose at random a cardinal direction, walk one block (ten pixels), choose another direction, walk another block, and so on. Notice that some of the time our explorer will retrace his path.

To avoid losing track of our explorer, we have applied a so-called boundary condition: he must stay in the city (or in this case, on the screen). So, the walk will be random as long as he remains in the city, but he may not go outside the city limits. Figure 1 shows the results about halfway through the random walk.

Our explorer will continue his odyssey until we press the RUN/STOP key. But let's see how patient we are. Let him continue to walk until he has covered the entire city, that is, until the entire grid has been filled in. You might even want to start timing him when you type RUN, and note how long it takes to complete the grid pattern. You'll see that it takes quite a long time, but he eventually does it, as Figure 2 shows.

Before leaving this topic, let's see how long it takes someone who knows the way around the city to cover it. Type in NEW and enter the program Squares. Now run this one with your clock in hand and see how long it takes. The lesson here is that unless you've got a lot of time to kill, the random walk is just not the best way to see the city! ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

### Random Walk

```
10 GRAPHIC 1,1 : BOX 1, 0, 0, 319,
   199'CRIC
20 X = 160 : Y = 100'CJSB
30 M = INT(RND(1)*4 + 1)'FICD
40 ON M GOTO 50, 60, 70, 80'CMHD
50 DX = 10 : DY = 0 : GOTO 90'DLWF
60 DX = -10 : DY = 0 : GOTO 90'ELMH
70 DX =  0 : DY = 10 : GOTO 90'DLWH
80 DX =  0 : DY = -10'DITI
90 DRAW 1, X, Y TO X+DX, Y+DY'EMTL
100 X = X + DX : Y = Y + DY'EJPA
110 IF X < 10 OR X > 310 THEN X = X -
    DX'HLWD
120 IF Y < 10 OR Y > 190 THEN Y = Y -
    DY'HLIE
130 GOTO 30'BCKX
```

END

### Squares

```
10 GRAPHIC 1,1'BDHX
20 BOX 1, 0, 0, 319,199'BNWB
30 FOR Y = 0 TO 199 STEP 10
   : DRAW 1, 0,Y TO 319,Y : NEXT'HTQH
40 FOR X = 0 TO 319 STEP 10
   : DRAW 1, X,0 TO X,199 : NEXT'HTNI
```

END

by Chris Brinson and Marvin Alvarez

# Word Search Creator

*for the Commodore 64*



LESLIE ROGALSKI

Word Search Creator is an easy way to generate word search puzzles. Often used to stimulate the minds of school children, word searches have always been a source of education. Word Search Creator is a great utility for both teachers and parents alike because it allows you to customize your puzzles. It's also perfect for those of us who are hooked on word searches—those of us who look at the bottom of the magazine rack at the puzzle magazines. If you've been struggling to make your own puzzles, Word Search Creator will be a blessing. You have your choice of making your own puzzle, or selecting one of the sample puzzles (girls' names, boys' names, BASIC commands, baseball teams, U.S. presidents and U.S. capitols). In addition to printing the puzzle along with words, it also prints out an answer key.

The program asks for the dimensions of the puzzle. The program then asks for the words. After the words are entered they have to be put in an array. This is how it's done. Four random values are set to different variables: one for the X value of the first letter in the word to be put in the array, another for the Y value of that same letter. The last two values select the direction the word will take in the arrays. For example, if V = 0 and H = 1, then the word will appear normal. If V = 0 and H = -1, then then word will appear backward. If V = 1 and H = 1 then the word will appear diagonal. ■

## Variables

| | | |
|---|---|---|
| H$ | = | Program Heading |
| T$ | = | Title of Puzzle |
| C | = | Number of Columns |
| R | = | Number of Rows |
| W | = | Number of Words |
| L$(R,C) | = | Each Letter in the Puzzle |
| W$ | = | Words in Puzzle |
| L | = | Length |
| X | = | X Coordinate to First Letter in Word |
| Y | = | Y Coordinate to First Letter in Word |
| V | = | Vertical Direction Word Will Take |
| H | = | Horizontal Direction Word Will Take |

## Program Explanation

| | |
|---|---|
| 100-150 | Program Introduction |
| 160-310 | Entering Data |
| 320-420 | Entering Words |
| 430-670 | Puts Words Into Puzzle |
| 680-720 | Prints Answer Key |
| 730-820 | Prints Puzzle |
| 830-850 | Ask User If He/She Wants Another Copy |
| 860-910 | Ask User If He/She Wants to Make Another Puzzle |
| 1000-1190 | Prints Puzzle |
| 2000-2250 | Main Menu Subroutine |
| 3000-3520 | Data for Preset Puzzles |

■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

### Word Search Creator

```
100 PRINT"[CLEAR]":CLR:RESTORE'DCAW
110 PRINT"[CLEAR]"'BATW
120 POKE 53280,11:POKE 53281,12
    :PRINT"[BLACK]"'DSMC
130 PRINT"  [CMDR A,SHFT *36,CMDR S]
    "'BAKC
132 FOR T=1 TO 20'DEOC
134 PRINT"  [SHFT -,SPACE36,SHFT -]"
    :NEXT T'CCFK
136 PRINT"  [CMDR Z,SHFT *36,CMDR X]
    "'BAWI
138 PRINT"[HOME,DOWN13]"'BALH
140 PRINT TAB(9)"THE WORD SEARCH
    CREATOR"'CCTG
142 PRINT TAB(7)"CREATED BY BALVA
    ENTERPRISES"'CCWK
143 PRINT'BACC
144 PRINT TAB(8)"[RVS]PRESS ANY KEY
    TO CONTINUE[RVOFF]"'CCKM
146 WAIT 198,1:POKE 198,0'CLUI
148 PRINT CHR$(147)'CFBJ
150 H$="[CLEAR,SPACE8]THE WORD SEARCH
    CREATOR"'BCJJ
155 GOTO 2000'BEYG
160 PRINT H$:PRINT'CDPC
170 PRINT"ENTER NAME OF WORD SEARCH
    PUZZLE"'BAYL
180 OPEN 1,0:INPUT#1,T$:CLOSE 1'DKBG
190 PRINT H$:PRINT:PRINT"TITLE
    :[SPACE4]"T$:PRINT'EHFK
200 PRINT"ENTER THE # OF COLUMNS
    PLEASE (10-38)"'BAEF
210 OPEN 1,0:INPUT#1,C:CLOSE 1
    :IF C<10 OR C>38 THEN 210'ITYF
220 PRINT H$:PRINT:PRINT"TITLE
    :[SPACE4]"T$:PRINT:PRINT"COLUMNS
    : "C:PRINT'GKNI
222 IF A=2 THEN 2240'DGFD
230 PRINT"ENTER THE # OF ROWS
    (10-40)"'BASF
240 OPEN 1,0:INPUT#1,R:CLOSE 1
    :IF R<10 OR R>40 THEN 240'ITJJ
250 PRINT H$:PRINT:PRINT"TITLE
```

```
    :[SPACE4]"T$:PRINT:PRINT"COLUMNS
    : "C:PRINT'GKNL
260 PRINT"ROWS:[SPACE4]"R:PRINT'CCYF
270 PRINT"ENTER THE # OF WORDS IN
    PUZZLE";'BBKL
280 WW=C+R:PRINT"(1-"WW"[LEFT])"
    :OPEN 1,0:INPUT#1,W:CLOSE 1
    :IF W<1 OR W>WW THEN 280'LBAS
290 PRINT H$:PRINT:PRINT"TITLE
    :[SPACE4]"T$:PRINT:PRINT"COLUMNS
    : "C:PRINT'GKNP
300 PRINT"ROWS:[SPACE4]"R:PRINT
    :PRINT"WORDS:[SPACE3]"W:PRINT'EFSE
305 PRINT"[SPACE8]TYPE ANY KEY TO
    CONTINUE"'BAVK
310 WAIT 198,1:POKE 198,0'CLUB
320 PRINT H$:PRINT:DIM L$(R,C)
    :DIM W$(W)'ERCE
330 L=C:IF R<C THEN L=R'FHSF
340 PRINT" ENTER THE WORDS,
     BE SURE THAT THEY ARE"'BASL
342 PRINT"[SPACE6]LESS THAN"L"LETTERS
    IN LENGTH"'BBYL
344 PRINT:PRINT'CBHG
360 FOR T=1 TO W'DDDF
370 PRINT"WORD #"T":";'BCFG
380 OPEN 1,0:INPUT#1,W$(T):CLOSE 1
    :PRINT'EOSK
390 IF LEN(W$(T))>L THEN PRINT"TO
    LONG":GOTO 370'GMGO
400 NEXT T'BBNX
410 PRINT"[SPACE8]TYPE ANY KEY TO
    CONTINUE"'BAVH
420 WAIT 198,1:POKE 198,0'CLUD
430 PRINT H$:PRINT:PRINT" PLEASE WAIT
    : PUTTING WORDS INTO PUZZLE"
    :PRINT'EFBP
435 PRINT"[SPACE3]PLEASE ADVANCE
    PRINTER TO NEXT PAGE"'BAIQ
440 FOR T=1 TO R:FOR TT=1 TO C
    :L$(T,TT)="[SHFT Q]"
    :NEXT TT,T'IWBN
450 FOR T=1 TO W'DDDF
460 X=INT(RND(1)*R)+1'FIMJ
470 Y=INT(RND(1)*C)+1'FIYK
480 V=INT(RND(1)*3)-1'FIGL
490 H=INT(RND(1)*3)-1'FIWL
500 IF V=0 AND H=0 THEN 480'FHWD
510 XX=X:YY=Y'CHBD
520 FOR TT=1 TO LEN(W$(T))'EKCF
530 D$=MID$(W$(T),TT,1)
    :IF D$=" "THEN 600'FUSJ
540 C$=L$(X,Y):IF C$<>D$THEN 560'FRPJ
550 GOTO 570'BDLF
560 IF C$<>"[SHFT Q]"THEN 460'EFEJ
570 X=X+V:Y=Y+H'EHQK
580 IF X>R OR X<1 THEN 460'FHTM
590 IF Y>C OR Y<1 THEN 460'FHGN
600 NEXT TT:X=XX:Y=YY'DKVF
610 FOR TT=1 TO LEN(W$(T))'EKCF
620 D$=MID$(W$(T),TT,1)
    :IF D$=" "THEN 650'FUXJ
630 L$(X,Y)=D$'BJIF
640 X=X+V:Y=Y+H'EHQI
650 NEXT TT:PRINT W$(T):NEXT T'DKTJ
660 PRINT"[SPACE8]TYPE ANY KEY TO
    CONTINUE"'BAVO
667 PRINT'BACN
670 WAIT 198,1:POKE 198,0'CLUK
680 PRINT H$:PRINT:PRINT"PLEASE TURN
    PRINTER ON THEN TYPE ANY KEY"'DECV
690 GET A$:IF A$=""THEN 690'EION
700 PRINT H$:PRINT:PRINT
    :PRINT SPC(16)"PRINTING"'FINI
710 PRINT:PRINT SPC(15)"ANSWER
    KEY"'DEFH
720 A$="Y":GOSUB 1000'CHXF
730 PRINT H$:PRINT:PRINT
    :PRINT"REPLACING DOTS WITH
    LETTERS, PLEASE WAIT"'EFMS
740 FOR T=1 TO R:FOR TT=1 TO C'GISK
750 IF L$(T,TT)<>"[SHFT Q]
    "THEN 770'ELNL
760 L$(T,TT)=CHR$(INT(RND(1)*26)+65)
    'GTFP
770 NEXT TT,T'BETJ
780 PRINT H$:PRINT:PRINT"PLEASE TURN
    PRINTER ON THEN TYPE ANY KEY"'DECW
785 PRINT"[SPACE6]ADVANCE PRINTER TO
    NEXT PAGE"'BAGX
790 GET A$:IF A$=""THEN 790'EIPO
800 PRINT H$:PRINT:PRINT
    :PRINT SPC(16)"PRINTING"'FINJ
810 PRINT:PRINT SPC(17)"PUZZLE"'DEVH
820 A$="N":GOSUB 1000'CHMG
830 PRINT H$:PRINT:PRINT"WOULD YOU
    LIKE ANOTHER COPY(Y/N)."'DEYQ
840 GET A$:IF A$<>"Y"AND A$<>"N"THEN
    840'IKWN
850 IF A$="Y"THEN 780'DFPK
860 PRINT H$:PRINT:PRINT"DO YOU WANT
    TO MAKE ANOTHER PUZZLE(Y/N)."'DEDV
870 GET A$:IF A$<>"Y"AND A$<>"N"THEN
    870'IKAQ
880 IF A$="Y"THEN RUN'ECTN
890 PRINT H$:PRINT:PRINT" I HOPE YOU
    HAD FUN MAKING YOUR PUZZLE."'DEQY
900 PRINT"[SPACE12]PLEASE COME
    BACK"'BAKJ
910 END'BACE
1000 OPEN 4,4'BDAT
1005 S$="":FOR T=1 TO(21-LEN(T$)/2)
     :S$=S$+" ":NEXT'KUHI
1010 PRINT#4,CHR$(14)S$T$'CKYW
1020 PRINT#4:PRINT#4'CDJV
1030 IF A$<>"Y"THEN 1050'EGBA
1040 PRINT#4,CHR$(14)"[SPACE16]
     ANSWER KEY"'CGLE
1050 PRINT#4:PRINT#4,CHR$(15)'DIXB
1060 S$="":FOR T=1 TO(41-(C))
     :S$=S$+" ":NEXT'ISUI
1070 FOR T=1 TO R'DDXC
1080 PRINT#4,S$;'BFTC
1090 FOR TT=1 TO C'DERE
1100 PRINT#4,L$(T,TT)" ";'BLJW
1110 NEXT TT:PRINT#4:NEXT T'DGNX
```

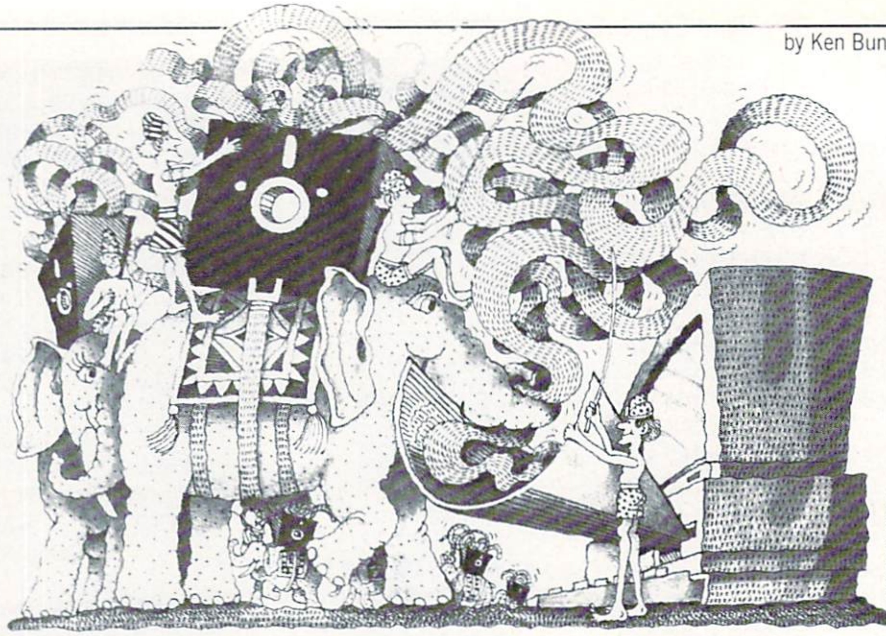
```
1120 PRINT#4:PRINT#4:PRINT#4'DFPX
1130 FOR T=1 TO W'DDDY
1140 PRINT#4,CHR$(16)"10"W$(T);:T=T+1
     :IF T>W THEN 1170'HXCI
1150 PRINT#4,CHR$(16)"30"W$(T);:T=T+1
     :IF T>W THEN 1170'HXEJ
1160 PRINT#4,CHR$(16)"55"W$(T)'CLDE
1170 NEXT T:PRINT#4'CDTC
1180 CLOSE 4'BBLC
1190 RETURN'BAQD
2000 PRINT H$:PRINT:PRINT'DEUV
2010 PRINT"WORD SEARCH OR CHOOSE FROM
     THE FOLLOWING"'BAXG
2020 PRINT:PRINT" 1) YOUR OWN"
     :PRINT'DCSB
2030 PRINT" 2) GIRL'S NAMES"
     :PRINT'CBEC
2040 PRINT" 3) BOY'S NAMES":PRINT'CBMD
2050 PRINT" 4) BASIC COMMANDS"
     :PRINT'CBKE
2060 PRINT" 5) BASEBALL TEAMS"
     :PRINT'CBHF
2070 PRINT" 6) U.S. PRESIDENTS"
     :PRINT'CBNH
2080 PRINT" 7) U.S. CAPITALS"
     :PRINT'CBRH
2090 PRINT"TYPE THE NUMERAL ACCORDING
     TO YOUR[SPACE6]CHOICE,
      PLEASE."'BAGR
2100 GET A$:IF A$=""THEN 2100'EJAY
2110 A=ASC(A$)-48:IF A<1 OR A>7 THEN
     2100'IQDE
2120 IF A=1 THEN 2150'DGEA
2130 PRINT H$:PRINT:PRINT:PRINT'EFAB
2135 PRINT"[SPACE2]PLEASE WAIT WHILE
     DATA IS BEING READ"'BAKN
2140 C=30:R=30:W=20'DLHD
2150 ON A GOTO 160,2160,2170,2180,
     2190,2200,2210'CJWH
2160 T$="GIRL'S NAMES":GOTO 2220'CHYG
2170 T$="BOY'S NAMES":GOTO 2220'CHFH
2180 T$="BASIC COMMANDS"
     :GOTO 2220'CHWJ
2190 T$="BASEBALL TEAMS"
     :GOTO 2220'CHSK
2200 T$="U.S. PRESIDENTS"
     :GOTO 2220'CHEC
2210 T$="U.S. CAPITALS":GOTO 2220'CHBD
2220 DIM L$(R,C):DIM W$(W)'CNJB
2221 IF A=2 THEN 2240'DGFC
2230 FOR T=1 TO(20*(A-2)):READ X$
     :NEXT'HOJG
2240 FOR T=1 TO 20:READ W$(T)
     :NEXT T'FMYF
2250 GOTO 440'BDHC
3000 DATA SARAH,TONIA,MELISSA,TAMMY,
     AMY,DEBRA,KRISTI,SUSAN,
     KATHERINE'BIML
3010 DATA CORA,MELANIE,SAMANTHA,
     STEPHANIE,DEENA,TRACEY,STACEY,
     ANN'BFSL
3100 DATA BECKY,JANA,LAURA,CHRIS,
     MARVIN,MAURICE,ANTHONY,
     MATTHEW'BDIL
3110 DATA CHARLES,GEORGE,ROBERT,ALLAN,
     CARL,BRAIN,DENNIS,MIKE,BRUCE'BGKM
3115 DATA JOHN,THOMAS,DOUG,STU,TROY,
     KEVIN'BGEL
3200 DATA PRINT,LIST,LET,READ,INPUT,
     GET,GOTO,GOSUB,RETURN,DIM'BBML
3210 DATA SAVE,LOAD,NEW,END,STOP,POKE,
     PEEK,CONT,SPC,TAB'BUTK
3300 DATA YANKEES,RED SOX,WHITE SOX,
     METS,PIRATES,ASTROS,RANGERS'BBQN
3310 DATA CUBS,EXPOS,REDS,CARDINALS,
     PADRES,ROYALS,BLUE JAYS,
     INDIANS'BGWP
3320 DATA ATHLETICS,GIANTS,ORIOLES,
     DODGERS,MARINERS'BQGM
3400 DATA WASHINGTON,ADAMS,LINCOLN,
     JOHNSON,JEFFERSON,MONROE,JACKSON,
     REAGAN'BORR
3410 DATA CARTER,FORD,NIXON,KENNEDY,
     EISENHOWER,TRUMAN,ROOSEVELT'BDNP
3420 DATA HOOVER,WILSON,HARDING,
     GARFIELD,TAFT'BKAL
3500 DATA AUSTIN,SANTA FE,LITTLE ROCK,
     CARSON CITY,BATON ROUGE,
     JACKSON'BFWQ
3510 DATA ATLANTA,OLYMPIA,PROVIDENCE,
     DOVER,INDIANAPOLIS,TOPEKA,
     RICHMOND'BLWS
3520 DATA PHOENIX,TALLAHASSE,
     SACRAMENTO,PIERRE,FRANKFORT,
     AUGUSTA,ALBANY'BLKT
```

**END**

by Ken Bunzel

# Loader Maker

*for the Commodore 64*


GORDON KIBBEE

Create a separate loader program for each of your disks.

Before loading a program, it is often necessary to list the directory to the screen to find the correct name and/or spelling. Then the LOAD command is typed in front of the desired program and ,8,1: behind it. But this technique becomes difficult when the whole directory does not fit on the screen.

To simplify the loading process, this program reads the directory and creates a separate loader program around six to eight blocks long for each of your disks. When a loader program is run, you only need to move a reversed field with the cursor keys and press RETURN to load a program. The program is automatically loaded and run.

To load a program without running it, make the following change.

670 POKE198,1:POKE631,13

To make a version that will read any directory and immediately let you load a program, delete lines 220-410 and line 430 and make the following additional changes.

```
40 PRINT"  THEN CHOOSE A PRO-
           GRAM TO LOAD WITH"
50 PRINT"  THE CURSOR AND
           RETURN KEYS."
```

This version will not create a separate loader program. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

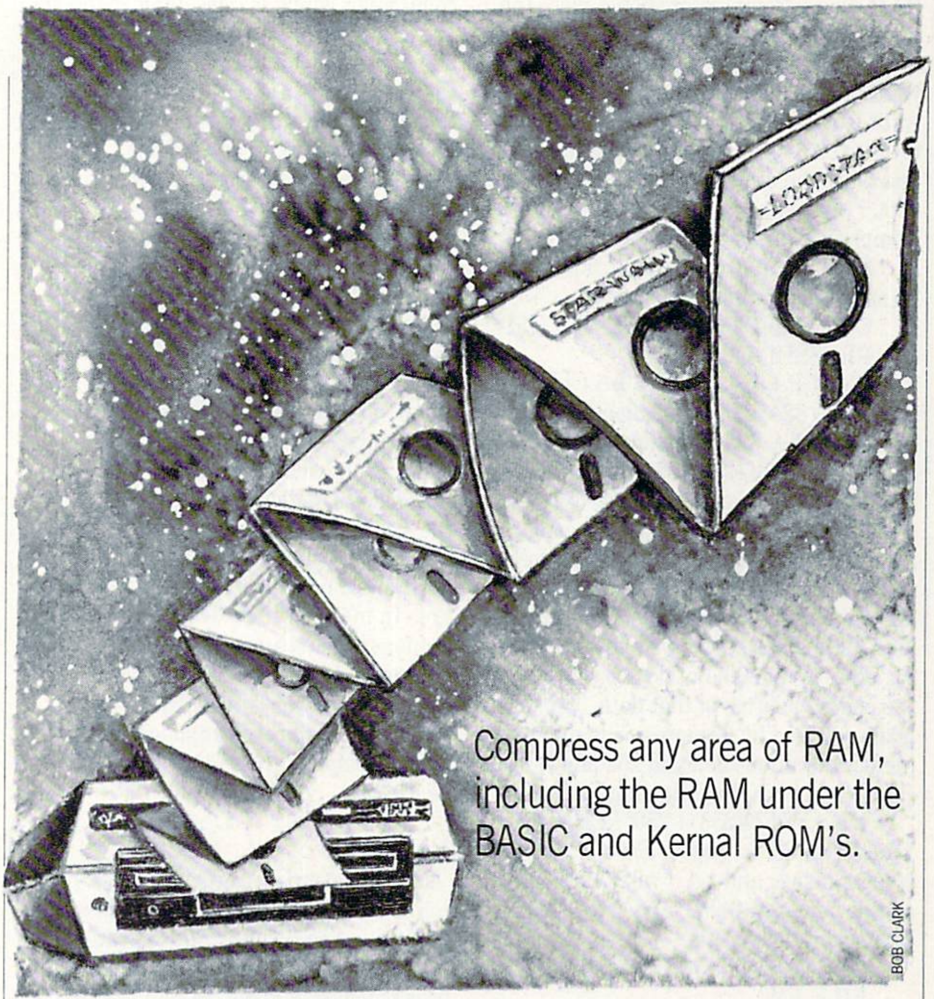
**Loader Maker**

```
10 POKE 5328Ø,9:POKE 53281,8'CPDB
2Ø PRINT"[CLEAR,DOWN9,BLACK,SPACE2]
   PLACE A DISK IN THE DRIVE AND
   PRESS"'BAGJ
3Ø PRINT"[SPACE2,RVS]RETURN[RVOFF]
    TO READ THE DIRECTORY.[DOWN]"'BANI
4Ø PRINT"[SPACE2]THEN YOUR LOADER
   PROGRAM FOR THE"'BASJ
5Ø PRINT"[SPACE2]DISK WILL BE
   CREATED."'BAPH
6Ø GET A$:IF A$<>CHR$(13)THEN 6Ø'GLDI
7Ø PRINT"[CLEAR]NUMBER OF PROGRAMS:"
   :PRINT"READING DIRECTORY."'CBWP
8Ø DIM PR$(144),LE(144)
   :OPEN 1,8,Ø,"$Ø"'CXPK
9Ø GET#1,A$,A$,A$,B$:LE(L)=ASC
   (A$+CHR$(Ø))+256*ASC(B$+CHR$(Ø))
   'KMKT
1ØØ GET#1,B$:IF ST<>Ø THEN 2ØØ'FMQA
11Ø IF B$<>CHR$(34)THEN 1ØØ'FJMB
12Ø C$=""'BCZX
13Ø GET#1,B$:IF B$<>CHR$(34)THEN
    C$=C$+B$:GOTO 13Ø'JWJI
14Ø PR$(L)=C$'BIXB
15Ø GET#1,B$:IF B$=CHR$(32)THEN
    15Ø'FPEG
16Ø C$=""'BCZC
17Ø C$=C$+B$:GET#1,B$:IF B$<>""THEN
    17Ø'HSFK
18Ø IF LEFT$(C$,3)="PRG"THEN L=L+1
    :PRINT"[HOME]"TAB(19)L'IOJM
19Ø IF ST=Ø THEN 9Ø'DFKH
2ØØ CLOSE 1:L=L-1'DFXY
21Ø IF L=-1 THEN PRINT"[CLEAR]
    NO PROGRAMS ON DISK":END'GDAH
22Ø AD=49152:FOR A=Ø TO L
    :FOR B=1 TO LEN(PR$(A))'IWYH
23Ø POKE AD+B,ASC(MID$(PR$(A),B,1))
    :NEXT B'FUJG
24Ø POKE AD+B,13:POKE AD+B+1,LE(A)
    :AD=AD+2Ø:NEXT A'IBDL
25Ø AD=49152:A=Ø'CKCE
26Ø IF A>L THEN 33Ø'DFGF
27Ø A$="":B=1'CFRF
28Ø IF PEEK(AD+B)=13 THEN 3ØØ'FKTJ
29Ø A$=A$+CHR$(PEEK(AD+B)):B=B+1
    :GOTO 28Ø'ITFO
3ØØ LE=PEEK(AD+B+1):PRINT"[CLEAR,
    DOWN3]"A+1ØØØ" DATA "A$",
    "MID$(STR$(LE),2)'IYVJ
31Ø PRINT"A="A+1":AD="AD+2Ø":L="L"
    :GOTO26Ø"'DHJF
32Ø POKE 198,2:POKE 631,13:POKE 632,13
    :PRINT"[HOME]":END'FVUG
33Ø A=1Ø'BDIB
34Ø IF A=34Ø THEN 37Ø'DHKE
35Ø PRINT"[CLEAR,DOWN3]"A
    :PRINT"A="A+1Ø":L="L"
    :GOTO34Ø"'DGYJ
36Ø POKE 198,2:POKE 631,13:POKE 632,13
    :PRINT"[HOME]":END'FVUK
37Ø PRINT"[CLEAR,DOWN3] 4ØØ L="L'BBOH
38Ø FOR A=34Ø TO 39Ø STEP 1Ø:PRINT A
```

*Continued on pg. 104*

by Scott Miller Petty

# Commodore 64 Compressor



Compress any area of RAM, including the RAM under the BASIC and Kernal ROM's.

BOB CLARK

How many times have you realized the limitations of your disk drive—namely the lack of space the 1541 allows on each disk for storage? This 664 blocks of disk space are very few indeed when you are storing large files like high-resolution screens, lengthy sequential files, or simply big programs. How many times have you drawn intricate high-resolution screens and been unable to efficiently use those drawings in your programs?

An end to these frustrations is at hand. With the machine-language subroutine Compressor, you can compress any area of RAM, including the RAM under the BASIC and Kernal ROM's! After saving the compressed file to your disk, decompression is just a SYS call away. Additionally, two short BASIC programs are included, Picmasher and Decomp Demo, which converts multicolor high-resolution pictures into a common compressed format that can be easily viewed within BASIC programs.

Here are just some of the many advantages that can be obtained by using files compressed by Compressor.

**Saved storage space:** For example, the high-resolution picture PIC.GIRL that comes with the *Tech Sketch* drawing package normally occupies 40 blocks of disk space. After compression, PIC.GIRL takes up only 12 blocks of disk space.

**Smaller files load faster:** PIC.GIRL, before compression, loads in 28 seconds on an unmodified 1541 disk drive. Following compression, PIC.GIRL loads in a quick 10 seconds.

**Decompression nearly instantaneously:** Decompressor is able to uncrunch a 10K file in less than one second.

**Load high-resolution pictures with few SYS calls:** By using the program Picmasher, most multicolor high-resolution pictures can be converted into a common, shortened format. Before writing Picmasher, I had only two options when loading high-resolution pictures into my programs. One method, the method supplied by *Koalapainter*, involved loading the 10K picture into an area of free RAM and then relocating that picture with machine-language subroutines. Unfortunately, the programmer must leave a 10K buffer within the program so the picture can be loaded into this buffer prior to relocation. And the location of this buffer often leaves scant memory in RAM for a BASIC program.

The second method involves the splitting of each 40-block picture file into three parts and resaving these to disk. The largest part, a 32-block 8K section of the picture, contains the data for the bitmap, which determines whether each of the 8,000 pixels on your TV or monitor screen is on (lights up) or off. The other two parts, both requiring 1K of memory (four blocks of disk space), determine the colors of those 8,000 pixels. After splitting the picture files into these components, each component can be directly loaded into its appropriate RAM location.

As you can see, loading, splitting, resaving and reloading each picture can not only make for big headaches, but still shares some major drawbacks with the first option—both options still require the time associated with loading 10K of data into your computer's memory. Picmasher will transform these cumbersome 40-block picture files into smaller, faster loading files. In fact, most of these files will load in under the BASIC or Kernal ROM's occupying not one byte of free RAM!

## Using Compressor

Compressor is a 417-byte machine-language subroutine that takes any area of RAM, including the RAM under the BASIC ROM (40960-49151) and the RAM under the Kernal ROM (57344-65535), and through a series of calculations, compresses that area of memory. The compressed data can again be placed in any area of RAM in the 64. A short save routine is built into Compressor and can be used to save the compressed data. To compress an area of RAM, use the following format.

SYS CP, SA, PA, RA

CP stands for the starting address of the machine-language program Compressor, which as written is equal to 49152. (However, Compressor can be relocated.) SA denotes the starting address of the area of RAM which you want to crunch. PA stands for the starting address in

RAM where Compressor should place the compressed data. Finally, RA stands for the number of bytes, starting at SA, which should be compressed. Thus, if you want to compress the memory from 10000 to 19000 (which is 9,000 bytes of memory) and place the compressed data starting at 20000 (with the machine language for Compressor at 49152), you would type

SYS 49152, 10000, 20000, 9000

To save the compressed data type

OPEN2,8,2"FILENAME OF COMPRESSED FILE,P,W"

SYS CP+324, SA, EA, LA:CLOSE2

Here CP+324 is the starting address of Compressor + 324 (if Compressor resides at 49152, CP+324 would equal 49476). SA denotes the starting address of the data to be saved, EA denotes the ending address of that data, and LA stands for the desired loading address of the saved file. So to save the compressed data created in the lines above, we know the starting address (20000) but do not yet know the ending address of that data. The last address poked by Compressor is stored in memory locations 253 and 254 and can be calculated with the following line:

EA=PEEK(253)+256*PEEK(254)

Thus, with SA = 20000, EA = value calculated above, and LA = any value we choose (let's say 40960, under the BASIC ROM), to save our file

OPEN2,8,2,"COMPRESSED FILE,P,W"

SYSCP+324, 20000, EA, 40960:CLOSE2

The new compressed file called Compressed File will load at 40960 and can be decompressed with Decompressor as shown below. Notice that by specifying the loading address LA to be 40960, no free RAM need be allocated for the compressed file to be loaded into your 64. Another locale that can be used as a buffer when loading in compressed files—one that also uses no free RAM—is under the Kernal ROM at locations 57344-65535. Now, let's find out how to decompress our crunched files.

## Using Decompressor

Decompressor is a 255-byte machine-language program which uncrunches compressed disk files or areas of memory crunched by Compressor. There are two ways to use Decompressor, depending on whether or not you wish Decompressor to load in a compressed file. To load in a compressed file and to decompress that file, use the following format.

SYS DC, F$, LA, DA

DC stands for the start address of Decompressor which is relocatable (with Relocator) and as written equals 49152. F$ denotes the file-name of the compressed file. LA represents the load address of that file, while DA stands for the destination address of the decompressed data. So to reverse the compression that we carried out above, you would type:

SYS DC, "COMPRESSED FILE" 40960, 10000

It's that easy! The data from 10000-19000 is restored to its original state before we created the file COMPRESSED FILE. Another method can be used if you do not wish to load in a compressed file (the compressed data must be already resident anywhere in RAM). The format is as follows, with DC, LA, and DA having the same connotations:

SYS DC+26, LA, DA

Here LA represents the start of the area in memory to be decompressed, not the loading address of a file.

Finally, let's look at Picmasher and Decomp Demo, two short BASIC programs that reveal some of the applications for which Compressor and Decompressor can be used for.

## Picmasher

This program converts multicolor high-resolution picture files, such as those created with *Koalapainter*, into a common compressed format which loads in at any user-specified address. To compress *Koalapainter* files, Picmasher would need no explanation—just run the program and follow the on-screen prompts.

Those who use another commercial drawing program or those programmers who use their own format for storing multicolor high-resolution pictures can still use Picmasher. There is one limitation and a few pieces of information which you must supply to Picmasher. The limitation is that Picmasher can compress high-resolution files that load in up to but not greater than three parts. Here is the information you must supply.

1. The filename(s) of the file(s) which compose your picture.
2. The address of the video matrix data within the file(s) that make up your picture. This is the data that occupies the screen memory portion of your high-resolution drawing. This section of data will be 1,000 bytes long and is used to assign color to each pixel on your TV or monitor screen.
3. The address of the color data within your file(s). Again, this will be 1,000 bytes long and again helps determine the colors of the pixels on your screen.
4. The address of the bitmap data within your file(s). This area of data will be 8,000 bytes long and is used to determine the on/off status of each of your display's 8,000 pixels.

Supply these bits of information (no pun intended) and Picmasher should be able to successfully compress your drawing. Note: Picmasher will write the loading address of your compressed picture after the filename. This number should not be used when loading the compressed file—it is for your information only.

## Decomp Demo

Decomp Demo is easy to use and requires only the filename and the loading address of the compressed file. One point of interest within the program is that lines 65-70 demonstrate the compression of serially compressed files. Picmasher first compresses the video matrix, then the color memory, and finally the bitmap data. Each of the three sections is followed by a spacer which consists of the number 123 repeated six times. When decompressing the single compressed file (which contains three separate compressions), the spacer must be skipped. Memory locations 249 and 250 hold the last byte of memory peeked by Decompressor. To skip to the next section of compressed data, the following calculation is used.

R(1 or 2)=PEEK(249)+256*PEEK(250)+6

Any time that you need to find the last data location (of the compressed data) peeked by Decompressor, simply use the above equation.

## Relocator

Relocator will relocate Compressor or Decompressor to any area of free RAM, save the relocated file, and then note on-screen the new SYS locations for the relocated machine language. Just type in Relocator, run it, and follow the instructions given on your screen. If you use a relocated version of Compressor or Decompressor with Picmasher or Decomp Demo, be sure to change the appropriate lines within these programs (lines 220 and 60 respectively).

## Other Uses for Compressor and Decompressor

Here is where your imagination is the limit. You could save a block of low-resolution screens and decompress the screen you need to the current active screen, toggling between screens with SYS calls to

Decompressor. How about your larger programs? Save disk space and load time by compressing these files. Sequential files could also be compressed—load the old sequential file into memory, compress that file, and save that file as a sequential file by using the built-in save routine in Compressor.

OPEN2,8,2"COMPRESSED SEQ FILE,S,W"

SYS CP+324, SA, EA, LA:CLOSE2

Anything, as long as it resides or can be loaded into the 64's RAM, can be compressed and decompressed using Compressor and Decompressor. The benefits are many—smaller files make for faster loading, increased disk space and fewer headaches! ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

### Compressor

```
10 GOSUB 100'BDEX
20 PRINT"[CLEAR]SAVING -";'BBGB
30 P=49152 :REM $CØØØ (END AT
   49568)'CYWF
40 READ A:IF A=999 THEN 80'EIHE
50 IF A>255 THEN PRINT"ERROR IN LINE
   ";INT((P-49152)/8)+1000:GOSUB 200
   :STOP'KASQ
60 PRINT"[HOME,RIGHT12]";P'BCVE
70 PRINT#5,CHR$(A);:T=T+A:P=P+1
   :GOTO 40'HRDL
80 IF T<>58779 THEN PRINT"MISTAKE IN
   DATA - CHECK DATA LINES":GOSUB 200
   :END'HLAT
90 PRINT"DONE":CLOSE 5:CLOSE 15
   :END'EGDJ
100 OPEN 15,8,15'BHAV
110 OPEN 5,8,5,"COMPRESSOR.O,P,W"'BGSC
120 INPUT#15,A,B$,C,D'BLYY
130 IF A<>0 THEN PRINT A,B$,C,D
    :CLOSE 5:CLOSE 15:STOP'IQGG
140 PRINT#5,CHR$(0);CHR$(192);'DMGD
150 RETURN'BAQA
200 CLOSE 5'BBMV
210 PRINT#15,"S0:COMPRESSOR.O,P"'BDDC
220 CLOSE 15'BCGY
1000 DATA 32,56,193,133,251,165,100,
     133'BEXY
1001 DATA 252,32,56,193,133,253,165,
     100'BEBA
1002 DATA 133,254,32,56,193,133,249,
     165'BEOB
1003 DATA 100,133,250,165,252,201,208,
     144'BGMC
1004 DATA 10,120,165,1,41,253,133,
     1'BAMC
1005 DATA 76,49,192,165,1,41,254,
     133'BBTD
1006 DATA 1,169,0,133,2,32,83,192'BXLD
1007 DATA 162,7,160,0,202,224,0,
     240'BANF
1008 DATA 10,169,123,145,253,32,15,
     193'BDIG
1009 DATA 76,60,192,165,1,9,3,133'BXUG
1010 DATA 1,88,96,160,0,177,251,
     201'BAMY
1011 DATA 123,240,46,141,252,3,162,
     4'BBXA
1012 DATA 202,224,0,240,66,200,209,
     251'BDRB
1013 DATA 240,246,142,253,3,136,232,
     224'BEWD
1014 DATA 4,208,250,160,0,177,251,
     145'BCED
1015 DATA 253,32,1,193,32,15,193,
     32'BAFE
1016 DATA 29,193,165,2,208,204,76,
     83'BBXF
1017 DATA 192,145,253,32,1,193,32,
     15'BBHG
1018 DATA 193,169,123,145,253,32,15,
     193'BEMI
1019 DATA 169,1,145,253,32,15,193,
     32'BBLI
1020 DATA 29,193,165,2,240,173,96,
     162'BCWA
1021 DATA 3,32,29,193,165,2,201,
     255'BAIB
1022 DATA 240,31,202,224,0,208,242,
     200'BDIC
1023 DATA 32,29,193,165,2,201,255,
     240'BCHD
1024 DATA 16,173,252,3,192,255,208,
     5'BBOE
1025 DATA 160,255,76,209,192,209,251,
     240'BFLG
1026 DATA 230,140,254,3,169,123,160,
     0'BCVG
1027 DATA 145,253,32,15,193,173,252,
     3'BCKH
1028 DATA 145,253,32,15,193,173,254,
     3'BCMI
1029 DATA 145,253,32,15,193,162,0,
     232'BCDJ
1030 DATA 32,1,193,236,254,3,208,
     247'BBMB
1031 DATA 165,2,201,255,240,57,76,
     83'BBQC
1032 DATA 192,24,165,251,105,1,133,
     251'BDBD
1033 DATA 165,252,105,0,133,252,96,
     24'BCHE
1034 DATA 165,253,105,1,133,253,165,
     254'BECG
1035 DATA 105,0,133,254,96,56,165,
     249'BCUG
1036 DATA 233,1,133,249,201,0,208,
     15'BBUH
1037 DATA 165,250,233,1,133,250,201,
     255'BEQJ
1038 DATA 240,1,96,169,255,133,2,
     96'BAVJ
1039 DATA 32,253,174,32,158,173,32,
     206'BDLK
1040 DATA 177,165,101,96,32,56,193,
     133'BDVC
1041 DATA 249,165,100,133,250,32,56,
     193'BEEE
```

```
1042 DATA 133,251,165,100,133,252,32,
     56'BETF
1043 DATA 193,133,253,165,100,133,254,
     166'BGDG
1044 DATA 184,32,201,255,56,165,251,
     229'BEKH
1045 DATA 249,133,251,165,252,229,250,
     133'BGHI
1046 DATA 252,165,253,32,210,255,165,
     254'BFFJ
1047 DATA 32,210,255,160,0,177,249,
     32'BCFJ
1048 DATA 210,255,24,165,249,105,1,
     133'BDDK
1049 DATA 249,165,250,105,0,133,250,
     56'BDGL
1050 DATA 165,251,233,1,133,251,165,
     252'BEYE
1051 DATA 233,0,133,252,201,255,208,
     219'BEUF
1052 DATA 96,999'BGAB
```

END

### Decompressor

```
10 GOSUB 100'BDEX
20 PRINT"[CLEAR]SAVING -";'BBGB
30 P=49152 :REM $C000 (END AT
   49406)'CYNF
40 READ A:IF A=999 THEN 80'EIHE
50 IF A>255 THEN PRINT"ERROR IN LINE
   ";INT((P-49152)/8)+1000:GOSUB 200
   :STOP'KASQ
60 PRINT"[HOME,RIGHT12]";P'BCVE
70 PRINT#5,CHR$(A);:T=T+A:P=P+1
   :GOTO 40'HRDL
80 IF T<>34053 THEN PRINT"MISTAKE IN
   DATA - CHECK DATA LINES":GOSUB 200
   :END'HLET
90 PRINT"DONE":CLOSE 5:CLOSE 15
   :END'EGDJ
100 OPEN 15,8,15'BHAV
110 OPEN 5,8,5,"DECOMPRESSOR.O,P,
    W"'BGHC
120 INPUT#15,A,B$,C,D'BLYY
130 IF A<>0 THEN PRINT A,B$,C,D
    :CLOSE 5:CLOSE 15:STOP'IQGG
140 PRINT#5,CHR$(0);CHR$(192);'DMGD
150 RETURN'BAQA
200 CLOSE 5'BBMV
210 PRINT#15,"S0:DECOMPRESSOR.O,
    P"'BDLD
220 CLOSE 15'BCGY
1000 DATA 32,54,192,165,2,162,167,
     160'BCNX
1001 DATA 2,32,189,255,169,0,162,
     8'BYTY
1002 DATA 160,1,32,186,255,169,0,
     32'BAIA
1003 DATA 213,255,160,0,132,2,32,
     92'BAVB
1004 DATA 192,164,2,153,167,2,165,
     100'BCGC
1005 DATA 153,168,2,200,200,132,2,
     192'BCSD
1006 DATA 4,208,235,76,104,192,32,
     253'BCME
1007 DATA 174,32,158,173,32,163,182,
     160'BEIG
1008 DATA 0,177,100,133,2,200,177,
     100'BCLG
1009 DATA 133,249,200,177,100,133,250,
     160'BGPI
1010 DATA 0,177,249,153,167,2,200,
     196'BCQY
1011 DATA 2,208,246,96,32,253,174,
     32'BBQA
1012 DATA 158,173,32,206,177,165,101,
     96'BEPC
1013 DATA 173,168,2,201,208,176,9,
     165'BCTC
1014 DATA 1,41,254,133,1,76,127,
     192'BAHD
1015 DATA 120,165,1,41,252,133,1,
     173'BBTE
1016 DATA 167,2,133,249,173,168,2,
     133'BCQF
1017 DATA 250,173,169,2,133,251,173,
     170'BEDH
1018 DATA 2,133,252,32,158,192,165,
     1'BBHH
1019 DATA 9,3,133,1,88,96,160,0'BVTH
1020 DATA 177,249,201,123,240,40,145,
     251'BFXB
1021 DATA 32,178,192,32,192,192,76,
     160'BDXB
1022 DATA 192,96,24,165,249,105,1,
     133'BCRC
1023 DATA 249,165,250,105,0,133,250,
     96'BDKD
1024 DATA 24,165,251,105,1,133,251,
     165'BDBE
1025 DATA 252,105,0,133,252,96,200,
     177'BDEF
1026 DATA 249,201,123,208,7,192,5,
     240'BCHG
1027 DATA 216,76,206,192,160,0,32,
     178'BCNH
1028 DATA 192,177,249,141,248,2,32,
     178'BDBI
1029 DATA 192,177,249,170,173,248,2,
     145'BEUK
1030 DATA 251,32,192,192,202,224,0,
     208'BDAB
1031 DATA 243,32,178,192,76,160,192,
     999'BEJD
```

END

### Picmasher

```
10 IF Z<>0 THEN 175'EFNA
15 IF A=0 THEN A=1:LOAD"COMPRESSOR.O",
   8,1'FJGK
20 IF A=1 THEN A=2:POKE 56,19
   :POKE 55,135:CLR:A=2:DIM F$(3)'JCWJ
25 POKE 53281,15:POKE 53280,12
   :POKE 646,6'DXVJ
30 S$="[HOME,RVS,GRAY1,SPACE16]
```

```
   PICMASHER[SPACE15,RVOFF]"
   :PA=30960'CKYK
35 KO$="[RVS]"+CHR$(193)+"[RVOFF]PIC "
   :MI$="PIC."'FMIM
40 PRINT"[CLEAR]"S$"[DOWN8]"TAB(12)"
   [RVS,RED]K[RVOFF,BLUE]OALA"'CFRF
43 PRINT TAB(12)"[DOWN,RVS,RED]M
   [RVOFF,BLUE]ICROILLUSTRATOR"'CDRK
45 PRINT TAB(12)"[DOWN,RVS,RED]O
   [RVOFF,BLUE]THER"'CDNJ
50 WAIT 198,15:GET T$:BG=0:BO=0'ERGH
55 IF T$="K"THEN P$=KO$:P=1:L1=32576
   :L2=33576:L3=24576:BG=34576
   :BO=0'KVUX
60 IF T$="M"THEN P$=MI$:P=1:L1=6384
   :L2=7384:L3=8384:BG=6364
   :BO=6365'KUET
65 IF T$<>"O"AND T$<>"M"AND
   T$<>"K"THEN 50'KIOQ
70 IF T$="O"THEN PRINT"[CLEAR]"S$
   :GOTO 95'FHDI
75 PRINT"[CLEAR]"S$:INPUT"[RED,DOWN,
   RIGHT]FILENAME OF PICTURE ";F$
   :P$=P$+F$'ENGT
80 PRINT"[UP]"TAB(23)"[RVS,BLUE]"P$"
   [RVOFF]":IF LEFT$(P$,
   1)<>CHR$(18)THEN 95'ISKO
85 L=LEN(P$):IF L<17 THEN
   P$=P$+CHR$(32):GOTO 85'JUXT
90 P$=RIGHT$(P$,14):P$=CHR$(129)
   +P$'FTSM
95 INPUT"[RED,DOWN,RIGHT]
   NEW LOAD ADDRESS OF PIC ";F
   :N$=RIGHT$(STR$(F),LEN(STR$(F))-1)
   'HRFY
100 PRINT"[UP]"TAB(27)"[RVS,BLUE]"N$"
    [LEFT,RVOFF]":F1=INT(F/256)
    :F2=F-256*F1'IXPH
105 IF P THEN 165'CEEC
110 PRINT"[RED,RIGHT,DOWN]
    FILE LOADS IN [RVS,PURPLE]1[RVOFF]
     [RVS]2[RVOFF] [RVS]3[RVOFF,RED]
     PARTS ?"'BAIG
112 WAIT 198,15:GET T$:D=VAL(T$)'EPOD
115 PRINT"[UP]"TAB(15)"[BLUE,RVS,
    SPACE2]"T$"[SPACE2,RVOFF]"'CFZF
120 FOR I=1 TO D:PRINT"[DOWN,RIGHT,
    RED]FILENAME OF PART"I'EFKF
122 INPUT"[UP,RIGHT20]";F$(I)'BGDD
125 PRINT"[UP,RVS,BLUE]"TAB(22)F$(I)"
    [RVOFF]":NEXT:P$=F$(1):F$=P$'FWTK
130 INPUT"[DOWN,RIGHT,RED]
    ADDRESS OF VIDEO MATRIX IS ";
    L1'BDQG
135 L1$=RIGHT$(STR$(L1),
    LEN(STR$(L1))-1):PRINT"[UP]
    "TAB(30)"[RVS,BLUE]"L1$"[LEFT,
    RVOFF]"'IYRP
140 INPUT"[DOWN,RIGHT,RED]
    ADDRESS OF COLOR MEMORY IS ";
    L2'BDEH
145 L2$=RIGHT$(STR$(L2),
    LEN(STR$(L2))-1):PRINT"[UP]
    "TAB(30)"[RVS,BLUE]"L2$"[LEFT,
    RVOFF]"'IYVQ
150 INPUT"[DOWN,RIGHT,RED]
    ADDRESS OF YOUR BIT MAP IS ";
    L3'BDKI
155 L3$=RIGHT$(STR$(L3),
    LEN(STR$(L3))-1):PRINT"[UP]
    "TAB(30)"[RVS,BLUE]"L3$"[LEFT,
    RVOFF]"'IYAR
160 FOR I=1264 TO 1743:POKE I,32:NEXT
    :PRINT"[HOME,DOWN6]"'GQKI
165 K$="[RVS,GRAY1,SPACE40,RVOFF]"
    :PRINT"[DOWN]"K$"[DOWN]"K$'CHXP
170 PRINT"[UP3,RED,RVS,SPACE2]
    INSERT PICTURE DISK AND HIT [BLUE]
     RETURN [RED,SPACE2,RVOFF]"'BAXP
172 WAIT 198,15:GET T$'CJZH
175 IF P THEN 195'CEHJ
180 IF Z=0 THEN Z=1:LOAD F$(1),8,
    1'FOLJ
185 IF D>1 THEN IF Z=1 THEN Z=2
    :LOAD F$(2),8,1'IQCQ
190 IF D>2 THEN IF Z=2 THEN Z=3
    :LOAD F$(3),8,1'IQGM
195 IF Z=0 THEN Z=1:LOAD P$,8,1'FLWO
200 IF L3=24576 THEN P$=RIGHT$(P$,14)
    :P$="[RVS,SHFT A,RVOFF]"+P$'HVXG
205 PRINT"[RIGHT]"P$" IS NOW
    LOADED"'BCFF
210 PRINT"[DOWN]"K$"[DOWN]"K$
    :BG=PEEK(BG):BO=PEEK(BO)'FSCE
215 PRINT"[UP3,RED,RVS]
    INSERT DESTINATION DISK AND HIT
    [BLUE]RETURN[RVOFF]":WAIT 198,15
    :GET T$'DKDT
220 CP=49152:SV=CP+324'DPFD
225 IF L1>29960 AND L1<40960 THEN
    PA=5000'GUIL
230 IF L2>29960 AND L2<40960 THEN
    PA=5000'GUKH
235 IF L3>29960 AND L3<40960 THEN
    PA=5000'GUMM
240 SYS CP,L1,PA,1000'BNGD
245 RA=PEEK(253)+256*PEEK(254)'FPVL
250 SYS CP,L2,RA,1000'BNJE
255 RA=PEEK(253)+256*PEEK(254)'FPVM
260 SYS CP,L3,RA,8000'BNRF
265 RA=PEEK(253)+256*PEEK(254)'FPVN
270 IF L3=24576 THEN F$=RIGHT$(F$,
    LEN(F$)-2)'HTUL
275 OPEN 2,8,2,F$+CHR$(160)+N$+",P,W"
    :SYS SV,PA,RA,F'GBKS
277 PRINT#2,CHR$(BG)CHR$(BO)'DKNO
280 CLOSE 2:SYS 65484:PRINT TAB(6)"
    [DOWN,BLUE]OLD FILE LENGTH =
    10000 BYTES"'EKGP
285 PRINT TAB(6)"NEW FILE LENGTH =";
    :RA=RA-PA:PRINT RA"BYTES"
    :SA=10000-RA'HXJA
290 PRINT TAB(6)"[RED,SHFT *29,BLUE]
    "'CCDD
295 PRINT TAB(6)"MEMORY SAVED[SPACE4]
```

```
    ="SA"BYTES"'CEOR
297 PRINT TAB(13)"[DOWN,RED,RVS]
     HIT ANY KEY [UP,RVOFF]"'CDHS
300 WAIT 198,15:GET T$'CJZA
305 PRINT"[CLEAR]"S$"[DOWN3,RED]
     ANOTHER FILE (Y/N)[BLUE]"
    :WAIT 198,15:GET T$'DMTM
310 IF T$="Y"THEN Z=0:OPEN 15,8,15
    :PRINT#15,"I0:":CLOSE 15
    :GOTO 25'IWUI
```

END

### Decomp Demo

```
10 IF A>0 THEN 25'DELY
15 POKE 53280,12:POKE 53281,15
   :PRINT"[BLUE]":POKE 56,126
   :POKE 55,244:CLR'GIMM
20 IF A=0 THEN A=1:PRINT"[CLEAR]"
   :LOAD"DECOMPRESSOR.O",8,1'GKRI
25 T$="[HOME,RVS,GRAY1,SPACE12]
   DECOMPRESSOR DEMO[SPACE11]"
   :PRINT T$'CFCN
30 IF A=1 THEN A=2:POKE 53265,
   PEEK(53265)OR 16:INPUT"[DOWN,RIGHT,
   BLUE]FILENAME OF PIC. ";F$'IYUN
35 INPUT"[DOWN,RIGHT,BLUE]
   LOAD ADDRESS OF PIC ";LA'BDRK
40 PRINT"[DOWN2,SPACE3,RVS,GRAY1]
    HIT + KEY TO CHANGE BORDER
   COLOR."'BAIK
45 PRINT" [RVS,GRAY1] HIT - KEY TO
   CHANGE BACKGROUND COLOR."'BAAQ
50 PRINT"[SPACE3,RVS,GRAY1]
    HIT ANY OTHER KEY TO EXIT HIRES. "
   :FOR I=0 TO 1000:NEXT'FIEP
55 PRINT"[DOWN,BLUE,SPACE9,RVS]
    HIT RUN/STOP TO END [RVOFF]"'BAHO
60 GOSUB 115:GOSUB 100:POKE 53265,
   PEEK(53265)OR 16:D1=49152
   :D2=D1+26'INBO
65 SYS D1,F$,LA,52224:R1=PEEK(249)
   +256*PEEK(250)+6'HGRS
70 SYS D2,R1,55296:R2=PEEK(249)
   +256*PEEK(250)+6:SYS D2,R2,
   57344'IPBQ
75 R3=PEEK(249)+256*PEEK(250)+6
   :POKE 53281,PEEK(R3+1)
   :POKE 53280,PEEK(R3+2)'MPAY
80 WAIT 198,15:GET T$:IF T$="+"THEN
   BO=BO+1:IF BO>15 THEN BO=0'LARR
85 IF T$="-"THEN BG=BG+1
   :IF BG>15 THEN BG=0'JPJS
90 IF T$="+"OR T$="-"THEN POKE 53281,
   BG:POKE 53280,BO:GOTO 80'IYDP
95 GOSUB 115:WAIT 198,15:GET T$
   :GOSUB 100:GOTO 80'FUYQ
100 REM ******* CHANGE BANKS
    *********'BCRB
105 POKE 53272,56:POKE 53265,
    PEEK(53265)OR 32:POKE 53270,
    PEEK(53270)OR 16'HPLM
110 POKE 56578,PEEK(56578)OR 3
    :POKE 56576,(PEEK(56576)AND
    252)OR 0:RETURN'IKPI
115 REM ****** NORMAL SCREEN
    ********'BBYH
120 POKE 53272,21:POKE 53265,
    PEEK(53265)AND 223:POKE 53270,
    PEEK(53270)AND 239'HRGJ
125 POKE 56578,PEEK(56578)OR 3
    :POKE 56576,(PEEK(56576)AND
    252)OR 3:RETURN'IKSO
```

END

### Relocator

```
8 IF A>0 THEN 110'DFEI
10 POKE 53281,15:POKE 53280,12
   :POKE 646,6'DXVD
20 S$="[CLEAR,RVS,GRAY1,SPACE16]
   RELOCATOR[SPACE15,RVOFF]"'BCQH
30 PRINT S$"[DOWN3,RIGHT,BLUE]
   RELOCATE [RVS,RED]C[RVOFF,BLUE]
   OMPRESSOR OR [RVS,RED]D[RVOFF,BLUE]
   ECOMPRESSOR ?"'BCCM
40 WAIT 198,15:GET T$:IF T$="C"THEN
   F$="COMPRESSOR.O":L=417'HTUM
50 IF T$="D"THEN F$="DECOMPRESSOR.O"
   :L=255'FJCK
60 IF T$<>"C"AND T$<>"D"THEN 40'HGII
70 PRINT"[DOWN2,RIGHT,GRAY1,RVS]
   INSERT DISK CONTAINING "F$" "'BCFL
80 PRINT"[RIGHT,GRAY1,RVS,SPACE12]
   AND HIT RETURN[SPACE10]";
   :IF L=255 THEN PRINT"[SPACE2]"'FGEQ
90 WAIT 198,15:GET T$:IF
   T$<>CHR$(13)THEN 90'HSTN
100 IF A=0 THEN A=1:LOAD F$,8,1'FLMA
110 PRINT"[RVOFF]":INPUT"[DOWN2,RIGHT,
    BLUE]NEW LOCATION ";N'CDUC
120 INPUT"[DOWN,RIGHT]NEW FILENAME ";
    F$'BDFB
130 A=INT(N/256):B=N-256*A
    :PRINT"[DOWN2]"TAB(12)"[GRAY1]
    ...WORKING..."'ISNL
140 OPEN 2,8,2,F$+",P,W"
    :PRINT#2,CHR$(B);:PRINT#2,CHR$(A);
    'GWTI
150 FOR I=49152 TO I+L'EIYE
160 P=PEEK(I):IF P<>76 AND P<>108 AND
    P<>32 THEN PRINT#2,CHR$(P);
    :GOTO 300'PAHQ
170 Z=PEEK(I+2):IF Z<192 OR Z>194
    THEN PRINT#2,CHR$(P);
    :GOTO 300'LYKO
180 X=49152-N:Y=PEEK(I+1):A=Y+Z*256-X
    :Z=INT(A/256):Y=A-256*Z'PLFW
190 PRINT#2,CHR$(P);:PRINT#2,CHR$(Y);
    :PRINT#2,CHR$(Z);:I=I+2
    :GOTO 300'JDCQ
200 IF L=255 THEN 220'DHUY
210 CLOSE 2:PRINT"[DOWN2,GRAY1,RIGHT]
    NEW VALUE FOR 'CP' = "N:END'DEJF
220 CLOSE 2:PRINT"[DOWN2,GRAY1,RIGHT]
    NEW VALUE FOR 'DC' = "N:END'DEWG
300 IF I=49152+L THEN 200'EKKB
310 NEXT'BAEX
```

END

by Mark Jordan

# The 128 Mode

## *Story-Writer*




**Explore the Commodore 128 in its powerful native mode. Some of the articles in this column may be technical, some not so technical —but we guarantee that they will spark your creativity.**

How would you like to become a famous author? Imagine, for six months you hole away in your writing retreat somewhere up in the Catskills, tapping on your 128, drinking coffee, keeping the woodbox full, and spending long hours gazing across the sylvan valley. Then your work is finished and the world will never be the same. You spend the next half-year traveling the globe, signing books, giving speeches to queens and kings and doing spots on Nightline. And loving it.

Ah, but one book doth not a retirement make. You must head for the mountains again. You don't mind. You love the writing life. But you wonder if those six months couldn't somehow be reduced to five. What with the whirlwind travel in the other half of the year, you need a month to yourself to just mess around.

What you need is Story-Writer. If you're willing to spend just a couple hours typing it in (I know it's long, but just think of the lifestyle ahead), you may be able to reduce your writing time to four months, three months, or even one!

Story-Writer is a program that will help you create fiction. It relies heavily on the 128's windowing features and shows off just how nicely BASIC can manipulate windows (which was detailed in last month's article). It allows you to sketch a story outline, edit it, save it (and later load it back), and print it.

When you run the program, you will discover seven colorful windows on the screen. At the very bottom is the status window. This is where messages are printed and where you will do your typing. The other six windows hold six components of fiction: Setting, Plot, Protagonist, Antagonist, Conflict and Climax. You control the windows simply by pressing the number of the window you wish to output to.

It works like this. When you first run the program, all the windows are empty. You can choose to begin your story creation from any one of these six aspects. If you choose window 1 (Setting), you will discover the status window at the bottom prompts you with:

> Your setting should be a laboratory to study your protagonist in his struggle. Type in the general time and place of your story.

You then can type in your general setting in the input line that appears at the very bottom of the screen. The input routine allows you several editing luxuries. You may jump to the left or right of your line at any time by pressing CONTROL-cursor left or right. You may jump forward ten characters at a time by pressing TAB. Insert and delete work anywhere on the line.

When you have your general setting just right, terminate it with RETURN. If for any reason you wish to exit without inputting any idea, just press ESCAPE.

Assuming that you did input an idea for the general setting, it will print (with wordwrap) in the proper window above and then will prompt you for more information on the setting. The next prompt will request you to "type in several visual details of the opening scene."

This process continues until you have exhausted your idea supply. You may continue with up to 100 ideas per window, which should be more than ample. When you reach that point of idea exhaustion, you may either press ESCAPE or RETURN on a blank line to exit. Don't worry that you'll need to remember all this—the status line will remind you at all times what your options are.

After finishing your setting, you may decide to work on Plot. Press 2 and the Plot window becomes active. The prompts begin again. You will start typing again. This process continues until you've filled all six windows with information.

Of course, if you're like me, you will probably not get it all down right the first time. You may be answering a prompt on Climax which causes you to realize something in the plot needs clarifying. Or perhaps you'll see a typo up there in Setting. Just one? More like 50 typos.

It's time to edit. To do so, you must first make active the window you wish to edit. Simply press its number. The cursor keys are needed for two purposes: to scroll your window up and down and to select an item from the window. Use the cursor up-down keys to scroll the window (if its contents are greater than the window).

When you see an item you want to edit, use the cursor left-right keys to select it. When you press cursor-right, the top item in your window will be highlighted. To move down to the next item, press cursor-right again. To move back up, press cursor-left. This may take a little getting used to, but I think you'll find it a very simple way to edit your work.

Once you've selected an item to edit, press RETURN. It will now be seen in the input line on the bottom of the screen. You may use all the editing functions described above to change it any way you want.

Eventually, you'll get it just the way you want it. At that point, you may elect to save or print your work.

To save, press 7. You'll need to type in the filename as requested. Please note—all files saved with Story-Writer will be prefixed with SW. This is so the directory routine can selectively display just Story-Writer files. You should not type in the SW.

To print, press 9. You'll be reminded to turn on the printer.

The number 8 key, which we skipped over, is for loading previously saved files. When you press 8 you'll be given the option of seeing the directory (it will display in window 2) or loading. It is all quite intuitive and should be no problem for you the first time through.

There. You know how to run the program. It isn't a bit difficult. Now for a little explanation of the theory behind it.

First, you must understand that I am not, alas, a professional fiction writer. I have published many, many articles and even some semi-fiction (first person hu-

mor pieces), but I must be honest and tell you that my great American Novel is still simmering within.

I am, however, a high school English teacher who not only reads tons of professionally written fiction, but also reads megatons of amateurishly written fiction. I have also read numerous textbooks, how-to-write-fiction books, and other related stuff on the subject and after a while, some of the common, everybody-agrees-on-these principles have begun to emerge in my mind.

With that disclaimer out of the way, let me add another. This program was written for magazine publication. It is as long as I dare submit. Had I the luxury of tripling or quadrupling its length, not only could many conveniences have been added, but I also would have been able to step the user through a much more thorough prompting process. For those interested, I have included an address at the end of this article where you can get this enhanced version.

I also have included a sidebar for those who would like to expand and/or personalize the prompts or even alter the entire program to fit another theme. (I personally plan to do a Book Report Writer for my students and an Article-Writer for me.).

Nevertheless, Story-Writer is a powerful idea stimulant. Several brainstorming principles are involved. First, by allowing the user to see the different components of his story outline on-screen simultaneously, sparks of recognition will arc across the screen and the brain in unusual and enlightening ways. For instance, while typing some aspect of the conflict, a glance at the plot section may remind the user of a plot event that needs to be addressed more in the conflict.

Second, the prompts are just that—idea-prompters. They will nudge you in the general direction you need to be heading. As a teacher, I know the value of nudging questions. All students write better when they are prodded with good questions. These prompts are the culmination of my 12 years of teaching, writing and reading—boiled down to publication length.

Third, I believe the human brain likes to jump around with ideas. Unlike a train, which pretty much goes from origin to destination without deviation, most of my ideas leapfrog their way along, often sidetracked and seldom efficient. Story-Writer allows you to jump around with your brain while in the creation mode, then to easily jump around some more in the post-creation clean-up.

Finally, there's a fourth and, to me, the most important, brain-tickling aspect to Story-Writer—it lets you germinate your idea with whichever of the six story elements strikes your fancy. Sometimes you may simply want to do a story set in the Ozarks. Fine. Start with Setting. Other times you have a great climax, a twist, you'd love to write. Start with the Climax. Often you'll find you want to write about a certain type of character. That's a job for the Protagonist window.

The beauty of this approach is that once you begin heating up in one area, ideas start to pop in others until, pretty soon, all the kernals have popped and the story is ready to serve.

Computers are supposed to make us all more organized, right? Well, I think it's high time the world realized that computers are going to make us all more creative. By making the creation process more stimulating and efficient, I hope Story-Writer is a step in that direction.

*A more powerful version of Story-Writer can be obtained from Country Road Software, 70284 C.R. 143, Ligonier, IN 46767.*

## Personalizing Story-Writer

If you wish to change any particular prompt, it's a simple matter of finding the DATA statement and altering. You'll want to do your editing in upper-case/lower-case mode.

To add prompts, you'll need to do the following.

1) First, you must realize that each prompt consists of two data items. Some of them are, however, just a single line of text with an empty item expressed by a comma.

2) Change the IF P)5 THEN P=5 in line 360 to however many different prompts you will add per window (change the 5). Each window must have the same number of prompts though you can do as I did and cause some simply to be empty data (see 4 below).

3) If you decide to add more prompts, change the 5 in line 70 also to however many you wish to have.

4) If you have some windows that will have less than the maximum number of prompts, you'll need to add empty data. Do this as I did with extra commas in the right spots in the DATA statements. For example, if you decide to go with 10 prompts per window, you must have 20 data statements in sequence for each window, 2 for each prompt. If one window has less than 20, just add commas to the last prompt-data for that window to fill it out. Line 800 added two empty prompts (four items) to the Setting prompts.

If you decide to alter the theme of the program, you should also change the title. Line 95 is the place to do this. If you'd like to have more or less than six windows, sorry, I don't have the space to explain that here. However, it isn't hard if you study the listing—just laborious. Feel free to write if you have a special application or question.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

### Story-Writer

```
10 FAST:PRINT"[HOME2,CLEAR]"
   :TRAP 905'DGTB
15 FOR T=1 TO 7:READ W(T,1),W(T,2),
   W(T,3),W(T,4),W(T,5):NEXT'FOJN
20 DATA 0,0,30,4,6, 0,6,30,19,8, 32,2,
   55,9,2, 57,2,79,9,13'BWRH
25 DATA 32,11,79,15,3, 32,17,79,19,5,
   0,21,79,24,16'BQCL
30 FOR T=1 TO 7:W(T,0)=W(T,3)-W(T,1)+1
   :W(T,7)=-1:NEXT'JHSL
35 FOR T=1 TO 6:READ CH$(T)
   :PR$(T)=MID$(CH$(T),4):NEXT'HDLO
40 DATA " 1 -- [SHFT S]ETTING ",
   " 2 -- [SHFT P]LOT "," 3 --
   [SHFT P]ROTAGONIST "," 4 --
   [SHFT A]NTAGONIST "," 5 -- [SHFT C]
   ONFLICT "," 6 -- [SHFT C]
   LIMAX "'BFYY
45 FOR T=1 TO 20:SP$=SP$+"[SPACE4]"
   :NEXT:EX$=LEFT$(SP$,17)+"[RVS,
   SHFT P]RESS [SHFT R,SHFT E,SHFT T,
   SHFT U,SHFT R,SHFT N]
    ON BLANK LINE OR [SHFT E,SHFT S,
   SHFT C,SHFT A,SHFT P,SHFT E]
    TO EXIT."'JYAK
50 E$=CHR$(27):EM$=E$+"M":EL$=E$+"L"
   :RV$="[RVS]":J$=E$+"J":K$=E$+"K"
```

```
   :L$=CHR$(13):AB=1:O$=E$+"O"'QXWY
55 DE$=CHR$(20):HA$=E$+"Q"
   :F$="123456789":FF$=CHR$(15)
   :FO$=CHR$(143):WW$=F$+"AD"+L$+E$+"
   [UP,DOWN,LEFT,RIGHT]":AA=1:X1=1
   :Y1=1:C1=1'SJPK
60 DIM KE(255),WI(7),TW$(299),TW(299),
   W$(6,100),WW$(6,100),PT$(6,5,
   1)'BMUP
65 FOR T=32 TO 127:KE(T)=1:KE(T+128)=1
   :NEXT:KE(13)=2:KE(20)=3:KE(157)=4
   :KE(29)=5:KE(9)=6:KE(148)=7'NXXG
70 FOR T=1 TO 6:FOR I=1 TO 5
   :FOR J=0 TO 1:READ X$'KOYM
75 IF J=0 AND X$=""THEN X$="[SHFT C]
   ONTINUE TYPING IDEAS RELATED
   TO"+MID$(CH$(T),6)'IQXB
80 X$=LEFT$(SP$,(80-LEN(X$))/2)+X$
   :PT$(T,I,J)=X$'HHRP
85 NEXT:NEXT:NEXT'DCYK
90 COLOR 6,1:COLOR 5,1'CHTI
95 PRINT CHR$(14)E$"R[CLEAR,RVS,BLUE]
   ",,,,"[SPACE4,SHFT S] T O R Y -
   [SHFT W] R I T E R[DOWN,LEFT3]BY
   [SHFT M]ARK [SHFT J]ORDAN"EM$'CNDD
100 W=1:FOR T=1 TO 7:GOSUB 160
    :NEXT'GLHB
105 GOSUB 140:POKE 248,PEEK(248)OR 64
    :TS=0:C=0:TC=0:REM W=0:T=AA
    :GOSUB300'ITGP
110 DO:GET KEY A$:AB$=A$
    :AA=INSTR(WW$,A$):IF AA=0 THEN
    PRINT"[BELL]";:GOTO 110'LESK
115 CHAR 1,0,C-TS,TW$(C)+J$'DQMG
120 ON AA GOSUB 200,200,200,200,200,
    200,640,640,755,320,340,305,305,
    220,235,250,270'CTPL
125 IF K7=1 THEN GOSUB 135:W=0:T=AB
    :GOSUB 160'HRFK
130 LOOP'BAKX
135 T=7:W=1:K7=0:GOSUB 160'ENWI
140 PRINT"[SPACE3,SHFT U]
    SE CURSOR UP/DOWN TO SCROLL
    WINDOW'S CONTENTS, CURSOR
    LEFT/RIGHT TO EDIT."'BASU
145 PRINT"[SPACE2,SHFT E]
    DITING FUNCTIONS: [RVS] [SHFT A]
    [RVOFF] = [SHFT A]DD ITEM, [RVS]
    [SHFT D] [RVOFF] = [SHFT D]
    ELETE ITEM, [RVS] [SHFT R,SHFT E,
    SHFT T,SHFT U,SHFT R,SHFT N]
    [RVOFF] = EDIT ITEM."'BARF
150 PRINT"[SPACE5,SHFT P]RESS [GRAY1]
     1 - 6 [GRAY3] TO CHANGE WINDOWS,
    [CYAN] 7 TO [SHFT S]AVE, [L. BLUE
     8 TO [SHFT L]OAD ,[GRAY1] 9 TO
    [SHFT P]RINT.[GRAY3]"'BAHX
155 RETURN'BAQF
160 PRINT"[HOME2]":COLOR 5,C1
    :CHAR 1,X1,Y1,FO$+X$'ETRI
165 CN=W(T,0)/2:CN=INT(CN-(LEN(CH$(T)
    /2))'HCIQ
170 TT=1:IF T=7 THEN TT=0'FJOH
175 X1=W(T,1)+CN:Y1=W(T,4)+TT
    :C1=W(T,5):X$=CH$(T)'GOHU
180 COLOR 5,C1:CHAR 1,X1,Y1,LEFT$(X$,
    3)+FF$+MID$(X$,4,2)+FO$+MID$(X$,
    6)'JOPR
185 WINDOW W(T,1),W(T,2),W(T,3),W(T,
    4),W'BFLP
190 CU=PEEK(228)-PEEK(229)'EMIJ
195 RETURN'BAQJ
200 T=AB:W=0:GOSUB 160:T=AA
    :GOSUB 160'FSVD
205 IF W$(AA,0)=""THEN TS=0:GOSUB 360
    :T=AA:GOSUB 160:K7=1'ICDM
210 GOSUB 455:CD=CU:WC=TW(C)'DQAC
215 AB=AA:RETURN'CFBE
220 IF TS=0 THEN RETURN'EDWB
225 TS=TS-1:PRINT E$"W";
    :CHAR 1,0,0,TW$(TS)+J$:C=TS
    :TC=0'HIPQ
230 RETURN'BAQY
235 IF TS+CU=>D THEN RETURN'GFEJ
240 TS=TS+1:PRINT E$"V";
    :CHAR 1,0,CU,TW$(TS+CU)+J$:C=TS
    :TC=0'ILIO
245 RETURN'BAQF
250 IF C=0 THEN TC=0:RETURN'FGBF
255 IF C-TS=0 THEN T=C:GOSUB 220
    :C=T'HNHN
260 C=C-1:IF ASC(TW$(C))<>45 THEN
    255'HRXK
265 GOTO 295'BDPI
270 IF C=D THEN RETURN'ECXF
275 IF TC=0 THEN TC=1:GOTO 290'FKFN
280 IF C-TS=CU THEN T=C:GOSUB 235:C=T
    :TC=1'ISQN
285 C=C+1'CDTL
290 IF ASC(TW$(C))<>45 THEN 270'FNSL
295 CHAR 1,0,C-TS,TW$(C)+J$,1'DSYQ
300 RETURN'BAQW
305 AA=AB:WC=TW(C):IF WC=WI(AA)THEN
    WI(AA)=WI(AA)+1'HJAP
310 T1=C:GOSUB 360:C=T1
    :IF IP$<>""THEN T=AA
    :GOSUB 455'JWIJ
315 K7=1:RETURN'CETF
320 WC=TW(C):AA=AB'CMXD
325 FOR T=WI(AB)+1 TO WC STEP-1
    :WW$(AB,T)=WW$(AB,T-1)
    :W$(AB,T)=W$(AB,T-1):NEXT'LAGW
330 WW$(AA,WC)="":W$(AA,WC)=""
    :GOSUB 360'DYYH
335 WI(AA)=WI(AA)+1:GOTO 355'DRKK
340 IF TW$(C)="-"AND C=D THEN
    RETURN'GIJG
345 WC=TW(C):AA=AB:FOR T=WC TO D
    :WW$(AA,T)=WW$(AA,T+1)
    :W$(AA,T)=W$(AA,T+1):NEXT'KGNA
350 WW$(AA,D)="-":WI(AA)=WI(AA)-1'DXMJ
355 T=AB:GOSUB 160:GOSUB 455:K7=1
    :RETURN'FQDN
360 DO:P=WC+1:IF P>5 THEN P=5'HKQK
365 T=7:W=1:GOSUB 185:PRINT PT$(AA,P,
    0)L$PT$(AA,P,1)L$EX$'EOMT
```

```
370 IP$=WW$(AA,WC):GOSUB 485
    :IF IP$=""THEN EXIT'GVKN
375 WW$(AA,WC)=IP$'BNRM
380 T=AA:GOSUB 420:W$(AA,WC)=IP$
    :WC=WC+1:W=0:GOSUB 160'HIJR
385 IF AB$="A"OR AB$=CHR$(13)THEN EXIT
    :ELSE WI(AA)=WC'JTNV
390 IF W(AA,7)=>CU THEN W(AA,7)=CU-1
    :PRINT E$"V";'HXIQ
395 T=AA:CHAR 1,0,W(T,7)+1,"-"
    :PRINT EL$W$(AA,WI(AA)-1)"[LEFT]
    "EM$;'FNGX
400 W(T,7)=PEEK(235)-PEEK(229)'EQZE
405 IF WI(AA)=100 THEN EXIT'EJMH
410 LOOP'BAKY
415 RETURN'BAQE
420 LE=W(T,0):L=LE:LI=0'DQVG
425 IF LEN(IP$)<LE THEN 450'EKXJ
430 WD=0'BDYC
435 IF MID$(IP$,L-LI,1)<>" "AND WD<12
    THEN LI=LI+1:WD=WD+1:GOTO 435'NFWW
440 IP$=LEFT$(IP$,L-LI)+LEFT$(SP$,
    LI)+MID$(IP$,L-LI+1):LI=0'KJOR
445 L=L+LE:IF L=<LEN(IP$) THEN
    430'HOKP
450 RETURN'BAQD
455 PRINT"[CLEAR]";:POKE 248,128
    :LE=W(AA,0):D=0:TS=0:C=0:TC=0'HINU
460 FOR T=0 TO WI(AA):L=INT(LEN(W$(AA,
    T))/LE)+1:X$="-"+W$(AA,T)'KLVT
465 FOR I=1 TO L:TW$(D)=LEFT$(X$,LE)
    :X$=MID$(X$,LE+1):TW(D)=T'JKKX
470 IF D<=CU THEN PRINT TW$(D)'FJLK
475 D=D+1:NEXT:NEXT:TW$(D)="-"
    :IF L=1 THEN D=D-1'KSMU
480 POKE 248,PEEK(248)OR 64
    :RETURN'EMSK
485 COLOR 5,2:X3=1:X4=78:W=1'EPYR
490 WINDOW X3,24,X4,24,W:C2$=" "'CSQM
495 IF IP$<>"" THEN PRINT LEFT$(IP$,
    77)J$;:C2$=LEFT$(IP$,1)'IANW
500 Z=0:C=0:E=0:CP=0'EMUE
505 PRINT"[GRAY2]"C2$"[WHITE,LEFT]";
    :BX=76'CJFI
510 DO'BAJA
515 GET KEY A$:A=ASC(A$)
    :ON KE(A) GOSUB 540,555,560,575,
    590,610,625'GQLR
520 IF A=27 OR A=13 THEN EXIT'GGEG
525 CP=POS(0)'CFBI
530 LOOP'BAKC
535 BS=0:RETURN'CEMJ
540 IF A$=CHR$(34) OR LEN(IP$)=BX
    THEN RETURN'INJL
545 E=E+1:C2$=MID$(IP$,E+1,1)
    :IF C2$="" THEN C2$=" "'JYMT
550 PRINT A$"[GRAY3]"C2$"[WHITE,LEFT]
    ";:IP$=LEFT$(IP$,E-1)+A$+MID$(IP$,
    E+1)'IDKQ
555 RETURN'BAQJ
560 E=E-1:IF E<0 THEN E=0:RETURN'HJEL
565 IP$=LEFT$(IP$,E)+MID$(IP$,E+2)
    :A$=""'GVNS
570 PRINT DE$;:RETURN'CFWI
575 IF PEEK(211)=4 THEN E=1
    :PRINT C2$J$;:C2$=LEFT$(IP$,
    1)'IBEV
580 E=E-1:IF E<0 THEN E=0:RETURN'HJEN
585 A$=C2$:C2$=MID$(IP$,E+1,1)
    :PRINT A$"[LEFT2,GRAY3]"C2$"
    [WHITE,LEFT]";:RETURN'GCFY
590 IF PEEK(211)=4 THEN E=LEN(IP$)
    :PRINT C2$J$TAB(E);:C2$=""
    :GOTO 600'KENU
595 E=E+1:IF E>LEN(IP$) THEN E=E-1
    :RETURN'JOQW
600 A$=C2$:C2$=MID$(IP$,E+1,1)
    :IF C2$="" THEN C2$=" "'IBPK
605 PRINT A$"[GRAY3]"C2$"[WHITE,LEFT]
    ";:RETURN'CHQI
610 E=E+11:IF E>LEN(IP$) THEN E=E-11
    :GOTO 590'JTLL
615 A$=C2$:C2$=MID$(IP$,E+1,1)
    :IF C2$="" THEN C2$=" "'IBPQ
620 PRINT A$SPC(10)"[GRAY3]"C2$"
    [WHITE,LEFT]";:RETURN'DKJH
625 IF LEN(IP$)=BX THEN PRINT"[BELL]";
    :RETURN'GJQM
630 PRINT C2$"[LEFT]"A$O$"[GRAY3]
    [LEFT,WHITE]";:C2$=" "'CMFI
635 IP$=LEFT$(IP$,E)+" "+MID$(IP$,E+1)
    :RETURN'HTWR
640 T=7:W=1:GOSUB 160:K7=1
    :IF AA=7 THEN 675'HUNN
645 PRINT,,"[GRAY3,LEFT,RVS] [SHFT L]
     [RVOFF] TO LOAD, [RVS] [SHFT D]
    [RVOFF] FOR DIRECTORY, [RVS]
    [SHFT E]SCAPE [RVOFF]
     TO EXIT."'BCCB
650 GET KEY F$:IF F$="L"THEN 675'FIWK
655 IF F$="D"THEN 660:ELSE 745'EJVO
660 T=2:W=1:GOSUB 160'DJKK
665 DIRECTORY"SW.*":PRINT"[SHFT P]
    RESS ANY KEY TO CONTINUE."'CBMV
670 GET KEY A$:GOTO 640'DGQK
675 PRINT"[CLEAR,DOWN3,WHITE,SHFT F]
    ILENAME? (13 CHARACTERS MAX.)
    [SPACE2]SW............. "'BANA
680 IP$="":W=0:X3=35:X4=49:GOSUB 490
    :IF A=27 THEN 745'ICNT
685 IF AA=7 THEN 720'DGDQ
690 DOPEN#2,"SW."+(IP$)
    :IF DS>0 THEN 750'FQIQ
695 FOR T=1 TO 6:I=-1'FGMS
700 DO UNTIL X$="EOW":I=I+1:INPUT#2,X$
    :IP$=X$:GOSUB 420:WW$(T,I)=X$
    :W$(T,I)=IP$'KSIT
705 LOOP:WI(T)=I:WW$(T,I)=""
    :W$(T,I)="":X$="":NEXT'GDBQ
710 FOR AA=1 TO 6:IF WW$(AA,
    0)<>""THEN GOSUB 200'IRAK
715 NEXT:GOTO 740'CEXI
720 DOPEN#2,"SW."+(IP$),W
    :IF DS>0 THEN 750'FSIL
725 FOR T=1 TO 6:FOR I=0 TO WI(T)-1
    :X$=WW$(T,I):IF X$=""THEN
```

```
     X$="(EMPTY)"'MDNY
730 PRINT#2,CHR$(34)+X$:NEXT'EJLI
735 PRINT#2,"EOW":NEXT'CDJL
740 DCLOSE'BBNG
745 RETURN'BAQK
750 PRINT"[BELL,CLEAR,SHFT E]RROR";
    :SLEEP 2:GOTO 640'DIEM
755 T=7:WI=0:GOSUB 160:K7=1'EOUQ
760 PRINT,"[CLEAR] [SHFT T]
    URN ON PRINTER THEN PRESS [RVS]
    [SHFT P] [RVOFF] TO PRINT,
     ANY KEY TO EXIT."'BBFA
765 GET KEY F$:IF F$<>"P"THEN
    RETURN'HFDS
770 OPEN 2,4,7'BFWJ
775 FOR T=1 TO 6:PRINT#2,PR$(T)'EMTS
780 FOR I=0 TO WI(T):PRINT#2,WW$(T,I)
    :NEXT:PRINT#2:NEXT'HWTS
785 CLOSE 2:RETURN'CCDP
790 DATA "[SHFT Y]OUR SETTING SHOULD
    BE A LABORATORY IN WHICH TO STUDY
    YOUR PROTAGONIST.","[SHFT T]
    YPE IN THE GENERAL TIME AND PLACE
    OF YOUR STORY."'BBHT
795 DATA "[SHFT T]YPE IN SEVERAL
    VISUAL DETAILS OF THE OPENING
    SCENE.",'BBPF
800 DATA "[SHFT T]YPE IN SEVERAL
    NON-VISUAL IMAGES (HEARING, TASTE,
     TOUCH, SMELL)","THAT WOULD ADD
    AUTHENTICITY TO THIS SCENE.",,,,
    'BFOH
805 DATA "[SHFT T]HE FIRST EVENT IN
    YOUR STORY SHOULD PRESENT A
    PROBLEM TO YOUR PROTAGONIST.","
    [SHFT T]YPE IN YOUR OPENING
    'PROBLEM' EVENT."'BBMO
810 DATA "[SHFT T]HE SECOND EVENT
    SHOULD SHOW THE PROTAGONIST
    ATTEMPTING A QUICK SOLUTION.","
    [SHFT I]NSTEAD OF HELPING,
     THIS ATTEMPT WILL WORSEN THE
    PROBLEM."'BBOP
815 DATA "[SHFT T]HE NEXT EVENT
    SHOULD SHOW THE PROBLEM GROWING
    MORE INTENSE.","[SHFT T]
    YPE IN THE WORSENING
    'PROBLEM'."'BBQJ
820 DATA "[SHFT F]ROM THIS POINT
    FORWARD, EACH 'SOLUTION' MAKES
    THE PROBLEM WORSE.","[SHFT T]
    YPE IN HIS NEXT SOLUTION."'BBTF
825 DATA "[SHFT C]ONTINUE TYPING
    PROBLEMS/SOLUTIONS UNTIL THE
    PROBLEM BECOMES HOPELESS.",'BBDE
830 DATA "[SHFT Y]OUR PROTAGONIST
    NEEDS TO BE A PERSON THE READER
    CAN PULL FOR.","[SHFT T]
    YPE IN HIS NAME AND A BRIEF
    DESCRIPTION OF WHAT HE LOOKS
    LIKE."'BBNO
835 DATA "[SHFT Y]OUR PROTAGONIST
    NEEDS TO WANT SOMETHING.","
    [SHFT D]ECIDE WHAT HE WANTS AND
    TYPE IT IN."'BBNH
840 DATA "[SHFT Y]OUR PROTAGONIST
    NEEDS A WEAKNESS WHICH THE
    ANTAGONIST WILL EXPLOIT.","
    [SHFT W]HAT IS IT?"'BBSE
845 DATA "[SHFT Y]OUR PROTAGONIST
    NEEDS SOME NATURAL STRENGTHS
    WHICH HE RELIES ON TO SOLVE",
    "HIS PROBLEM.[SPACE2,SHFT T]
    HEY WILL FAIL HIM.[SPACE2,SHFT W]
    HAT ARE THEY?",,'BDCV
850 DATA "[SHFT T]HE ANTAGONIST CAN
    BE ANOTHER CHARACTER, SOCIETY,
     NATURE, OR SOMETHING WITHIN",
    "THE PROTAGONIST.[SPACE2,SHFT D]
    ECIDE WHICH IT WILL BE AND
    BRIEFLY DESCRIBE."'BBXV
855 DATA "[SHFT D]ESCRIBE THE
    ANTAGONIST.",'BBET
860 DATA "[SHFT Y]OUR ANTAGONIST MUST
    WANT SOMETHING YOUR PROTAGONIST
    WANTS.","[SHFT I]T COULD BE AS
    ABSTRACT AS HIS LIFE OR AS
    SPECIFIC AS A GIRL.[SPACE2,SHFT W]
    HAT IS IT?"'BBJU
865 DATA "[SHFT G]IVE YOUR ANTAGONIST
    A STRENGTH THAT EXPLOITS YOUR
    HERO'S WEAKNESS.",,,'BDYI
870 DATA "[SHFT Y]OUR CONFLICT MUST
    BE EITHER MAN VS. HIMSELF, MAN,
     SOCIETY, OR NATURE.","[SHFT T]
    YPE THE ONE THAT BEST 'TESTS'
    YOUR HERO."'BBUP
875 DATA "[SHFT T]YPE IN SPECIFICALLY
    WHAT ASPECT OF YOUR HERO THE
    STORY IS TESTING.","[SHFT E]XAMPLE
    :[SPACE2]AMBITION, PRIDE, HONESTY,
     DETERMINATION, ETC."'BBNX
880 DATA "[SHFT D]ESCRIBE THE INITIAL
    MOMENT OF CONFLICT FOR THE HERO.",
    'BBXA
885 DATA "[SHFT D]ESCRIBE THE NEXT
    CONFLICT SITUATION.",,,'BDAB
890 DATA "[SHFT T]HE CLIMAX IS THE
    POINT WHERE THE HERO MUST MAKE
    THE ULTIMATE CHOICE.","[SHFT D]
    ESCRIBE THE NEW SCENE WHERE THIS
    ULTIMATE STRUGGLE OCCURS."'BBBW
895 DATA "[SHFT N]OW DESCRIBE THE
    INSIGHT THE PROTAGONIST GAINS",
    "WHICH HE USES TO SOLVE THIS
    MOMENT OF DECISION."'BBFR
900 DATA "[SHFT D]ESCRIBE THE
    'DENOUCEMENT' -- THE SCENE THAT
    IMMEDIATELY FOLLOWS THE CLIMAX.",
    "[SHFT I]T SHOULD CLEAN UP ALL
    LOOSE PLOT STRANDS.",,,,'BFFL
905 PRINT"[HOME2,CLEAR] [SHFT O]OPS!
    [SPACE2,SHFT S]OMETHING'S WRONG.
    [SPACE2,SHFT C]ORRECT AND TRY
    AGAIN."'BAJX
910 FOR AA=1 TO 6:GOSUB 200:NEXT'FJMI
915 SLEEP 3:RESUME 90'CFFL
```

END

by Milum D. Perry, Jr.

# Harmonizer 128



BOB CLARK

## Write music that includes synchronizing multiple voices.

In 1983 I submitted an article and program to *Commodore Magazine* entitled The Harmonizer. The program, which was published in the June/July, 1983, edition of *Commodore Microcomputers*, was an adaption of Multiple Voices found on page 187 of *The Commodore 64 Programmer's Reference Guide.* The program permitted the user to enter and save music with the 64, synchronizing voices using the lettered note, the octave number, and a duration number based on 16 beats to the measure (C#,3,4).

I now have a 128 and have been impressed with the simplicity of writing music that includes synchronizing multiple voices. I found that the system I had devised for writing out the notes in columns by voice number was ideal, with a little modification for the 128 protocol for note entry. This article describes this procedure and gives you a short demonstration of how to use it.

Included within the article are some figures that show the non-musician how the placement of the notes and other symbols on the musical staffs translate into a lettered note and octave number as well as the number of beats assigned to each type note. The command that is associated with these notes and placed in the PLAY statement to make music is also shown. I have followed this with eight musical measures taken from Scott Joplin's *The Ragtime Dance* to demonstrate the conversion of music from a musical staff to a table consisting of the octave number, duration symbol, and the lettered note for each of the three voices of the computer. Each measure of the song is then translated note by note into a musical string that is used in the PLAY statement by the computer.

In the 64 version of The Harmonizer, notes were entered for the first voice for a number of measures, then the second voice for the same number of measures, and so on. In the 128 protocol, however, you enter notes line by line for all three voices (with some specific rules) until the string for the measure is completed. Each measure has 16 beats. Therefore, each line in my columnar diagram represents two beats (an eighth note, if you please).

There are five rules. First, the numbers and letters representing each note are placed within the column at the beat count where the note starts. If the note lasts for more than two beats (a quarter note), place a dash in the following line or lines to show how long the note lasts.

Second, in writing the PLAY musical string, start at voice 1 and proceed across the three columns. The entry which lasts the longest should be entered first. For example, in the first line of the first measure of the song, voice 1 has an eighth note, while the following two voices have quarter notes. If you look at the PLAY string for measure one, you will see that the V2 and V3 notes were entered before the V1 note. However, in line 2 only the V1 notes are entered because the V2 and V3 from the line above are still playing. This is indicated by the dashes under the columns.

Third, a dotted note increases a note's or rest's duration by 1½ times. Note measure 4. Fourth, a sharp (#) or flat ($) is placed before the lettered note; for example, #C and $F. Note measures 6 and 7. And fifth, a rest is denoted by R.

It is not necessary to place spaces within the musical string. However, for clarity's sake I have made each note an entity by using spaces to separate each note entry. I have also included in each note entry, the voice number (V1-3), the octave number (O2-5), and the duration letter (S,I,Q,H,W). If you have not entered a new number or letter, those parameters will actually carry over to the next note. However, a sharp or a flat is valid only for the note following it.

For clarity, and because we are not hurting for memory, I recommend entering all parameters for each note as I have done in the four PLAY strings I have written. I have even placed an octave number in a rest note entry. You will find it much easier to correct errors if each note entry stands alone.

The program assumes that the user has read section seven in the *Commodore 128 User's Manual.* The program uses the preprogrammed sound envelopes listed on page 144 of the manual unless you set your own using option eight from the menu. The use of the filter is as described

**Figure 1**

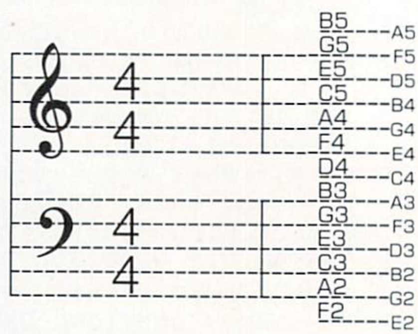
| Note | Beats | Command |
|---|---|---|
| 1/16 | 1 | S– |
| 1/8 | 2 | I– |
| .1/8 | 3 | .I– |
| 1/4 | 4 | Q– |
| .1/4 | 6 | .Q– |
| 1/2 | 8 | H– |
| .1/2 | 12 | .H– |
| Whole | 16 | W– |

(Dash represents lettered note)

| Rest | Beats | Command |
|---|---|---|
| 1/8 | 2 | IR |
| 1/4 | 4 | QR |
| 1/2 | 8 | HR |
| Whole | 16 | WR |

**Figure 2**

Notes on Treble and Bass Staffs




Sharp = #  Flat = $

Note: Symbol precedes the lettered note

Example: Dotted Half C-Sharp note in Octave 3, Voice 1:
V1 O3 .H #C

Example: Quarter Flatted F note in Octave 5, Voice 3:
V3 O5 Q $F

# The Ragtime Dance




in the manual. It is set initially with all parameters at zero.

Let's look briefly at the nine options on the menu.

LOAD SONG FROM DISK: The song files load quickly and play immediately, unlike the 64 Harmonizer Program.

SAVE A SONG TO DISK: This uses the save with replace option so as you write a song, you can periodically save it using the same file name.

START A SONG ENTRY: This gets you started on entering a song. You may use the default option of all three voices using envelope 0, piano, or you may set each voice separately as far as envelope number and filter on or off are concerned.

ADD NOTES TO SONG: This is self-explanatory. It picks up where you left off in entering a song using the same voice parameters.

RE-WRITE A SONG MEASURE: You are asked to enter the measure number that you with to re-write. The existing PLAY string is shown on the screen. You must completely re-enter the correct notes of the measure underneath.

SET FILTER: This lets you write in the parameters of a filter setting. You must then go to option 7 to change the filter on/off setting.

CHANGE VOICE PARAMETERS: Gives you an opportunity to experiment by changing the envelope used for each voice as well as the tempo and volume. Also, you can turn filters on or off.

SET NEW ENVELOPE: This lets you change the default envelope settings to some of your own. I recommend you utilize envelopes 3-5 for this purpose. Although the program states you may change up to three envelopes, the actual limits are envelopes 0 to 9.

PLAYBACK SONG: Press 9 and sit back to enjoy your creation!!

If you are ready to go, I suggest you try writing the musical strings for the second four measures of *The Ragtime Dance*. Enter them using option 3 on the menu. Play the song back when finished, then experiment with changing voice parameters and filter settings. Remember to turn the filter on with X1 in your voice parameter to make it operate. Incidentally, setting the voice parameter with a X1 setting with the filter zero setting will result in no sound from the voice.

In running the program, if the cursor is flashing, press ESC to return to the main menu. ■

**Figure 3**

| | Voice 1 | | | Voice 2 | | | Voice 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| No. | O. | D. | N. | O. | D. | N. | O. | D. | N. |
| 1. | 4, | I, | G | 3, | Q, | C | 4, | Q, | R |
| | 4, | Q, | G | | — | | | — | |
| | | — | | 3, | Q, | G | 3, | Q, | E |
| | 4, | I, | G | | — | | | — | |
| | 4, | Q, | G | 3, | Q, | G | 4, | Q, | R |
| | | — | | | — | | | — | |
| | 4, | Q, | G | 3, | Q, | G | 3, | Q, | E |
| | | — | | | — | | | — | |
| 2. | 4, | Q, | A | 3, | Q, | F | 4, | Q, | R |
| | | — | | | — | | | — | |
| | 5, | Q, | C | 4, | Q, | C | 3, | Q, | A |
| | | — | | | — | | | — | |
| | 5, | I, | C | 3, | Q, | C | 4, | Q, | R |
| | 4, | I, | A | | — | | | — | |
| | 5, | I, | C | 4, | Q, | C | 3, | Q, | A |
| | 5, | I, | F | | — | | | — | |
| 3. | 5, | I, | E | 3, | Q, | C | 4, | Q, | R |
| | 5, | I, | E | | — | | | — | |
| | 5, | I, | E | 3, | Q, | G | 3, | Q, | E |
| | 5, | I, | E | | — | | | — | |
| | 5, | Q, | G | 2, | Q, | G | 4, | Q, | R |
| | | — | | | — | | | — | |
| | 5, | Q, | E | 3, | Q, | G | 3, | Q, | E |
| | | — | | | — | | | — | |
| 4. | 5, | .H, | D | 4, | .H, | B | 4, | Q, | R |
| | | — | | | — | | | — | |
| | | — | | | — | | 3, | Q, | G |
| | | — | | | — | | | — | |
| | | — | | | — | | 3 | Q | F |
| | | — | | | — | | | — | |
| | 4, | Q, | G | 4, | Q, | R | 3, | Q, | D |
| | | — | | | — | | | — | |

**Figure 4**

The Corresponding "PLAY" strings for measures 1-4 are:

1. V203QC V304QR V104IG V104QG V203QG V303QE V104IG V104QG V203QG V304QR V104QG V203QG V303QE
2. V104QA V203QF V304QR V105QC V204QC V303QC V203QC V304QR V105IC V105IC V204QC V303QA V105IC V105IF
3. V203QC V304QR V105IE V105IE V203QG V303QE V105IE V105IE V105QG V202QG V304QR V105QE V203QG V303QE
4. V105.HD V204.HB V304QR V303QG V303QF V104QG V204QR V303QD

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

### Harmonizer 128

```
1ØØ GRAPHIC 5,1:COLOR 6,1'CHKX
1Ø5 YEL$=CHR$(158):RED$=CHR$(28)
    :BLU$=CHR$(31):GRN$=CHR$(153)
    :CYN$=CHR$(159)'KWUR
11Ø SO$=CHR$(18)+"** SELECT ONE
    **"+CHR$(146)'FMHF
115 PT$=CHR$(15)+CHR$(95)+CHR$(143)
    :TP=1:VM=1:DIM MS$(1ØØ)'JIEO
12Ø WINDOW Ø,Ø,79,24,1:PRINT YEL$
    :CHAR 1,7,2,"*** MENU ***":PRINT
    :PRINT'FBEI
125 PRINT TAB(1);RED$;"1. ";CYN$;
    "LOAD SONG FROM DISK"'CODM
13Ø PRINT:PRINT TAB(1);RED$;"2. ";
    CYN$;"SAVE SONG TO DISK"'DPII
135 PRINT:PRINT TAB(1);RED$;"3. ";
    CYN$;"START A SONG ENTRY"'DPKN
14Ø PRINT:PRINT TAB(1);RED$;"4. ";
    CYN$;"ADD NOTES TO SONG"'DPCJ
145 PRINT:PRINT TAB(1);RED$;"5. ";
    CYN$;"RE-WRITE A SONG
    MEASURE"'DPBQ
15Ø PRINT:PRINT TAB(1);RED$;"6. ";
    CYN$;"SET FILTER"'DPTI
155 PRINT:PRINT TAB(1);RED$;"7. ";
    CYN$;"CHANGE VOICE
```

```
     PARAMETERS"'DPCR
160 PRINT:PRINT TAB(1);RED$;"8. ";
     CYN$;"SET NEW ENVELOPE"'DPHL
165 PRINT:PRINT TAB(1);RED$;"9. ";
     CYN$;"PLAYBACK SONG"'DPXP
166 PRINT:PRINT YEL$TAB(1)"PRESS
     'ESC' TO RETURN TO MENU"'DHNS
170 PRINT GRN$:CHAR 1,5,24,SO$,1'CRXH
175 GET KEY A$:A=ASC(A$)-48
     :IF A<1 OR A>9 THEN 175'KSYR
180 ON A GOTO 185,255,330,500,620,555,
     525,730,675'CLVL
185 REM  *** LOAD A SONG FROM DISK
     ***'BXEO
190 CHAR 1,25,2+2*A,PT$'DMPI
195 GOSUB 920:PRINT RED$TAB(5)"LOAD A
     SONG FROM DISK":PRINT'ELKT
200 PRINT YEL$TAB(5)"ENTER NAME OF
     SONG...":PRINT'DHAE
205 PRINT TAB(5);:GOSUB 830
     :NS$=B$'ENCG
210 DOPEN#2,(NS$)'BJLY
215 PRINT:PRINT TAB(5)CYN$"LOADING '";
     NS$;"'"'DMRJ
220 INPUT#2,MM,TP,VM,SE,NR'BQUC
225 INPUT#2,CF,LP,BP,HP,RES'BRCH
230 IF SE=0 THEN 240'DGPC
235 FOR L=1 TO NR:INPUT#2,EV(L),AT(L),
     DY(L),SN(L),RL(L),WF(L),PW(L)
     :NEXT'FYKS
240 FOR K=1 TO 3:INPUT#2,VO$(K)
     :NEXT'FNTF
245 FOR I=1 TO MM:INPUT#2,MS$(I)
     :NEXT'FOHL
250 DCLOSE#2:GOTO 120'CHID
255 REM *** SAVE A SONG FILE TO DISK
     ***'BAGN
260 CHAR 1,25,2+2*A,PT$'DMPG
265 GOSUB 920:PRINT RED$TAB(5)"SAVE A
     SONG TO DISK":PRINT'ELJQ
270 PRINT YEL$TAB(5)"ENTER NAME OF
     SONG...":PRINT'DHAL
275 PRINT TAB(5);:GOSUB 830:NS$=B$
     :CR$=CHR$(13)'GVKQ
280 IF MM=0 THEN PRINT GRN$
     :PRINT TAB(5)"NO FILE IN MEMORY"
     :SLEEP 2:GOTO 120'IROR
285 DOPEN#2,"@"+(NS$),W'CLQN
290 PRINT:PRINT TAB(5)CYN$"SAVING '";
     NS$;"'"'DMSL
295 PRINT#2,MM;CR$;TP;CR$;VM;CR$;SE;
     CR$;NR'BHCS
300 PRINT#2,CF;CR$;LP;CR$;BP;CR$;HP;
     CR$;RES'BIJF
305 IF SE=0 THEN 315'DGSF
310 FOR L=1 TO NR:PRINT#2,EV(L);CR$;
     AT(L);CR$;DY(L);CR$;SN(L);CR$;
     RL(L);CR$;WF(L);CR$;PW(L)
     :NEXT'FXXS
315 FOR K=1 TO 3:PRINT#2,VO$(K)
     :NEXT'FNOI
320 FOR I=1 TO MM:PRINT#2,MS$(I)
     :NEXT'FOCF
325 DCLOSE#2:GOTO 120'CHIG
330 REM *** START A NEW SONG ENTRY
     ***'BYNH
335 CHAR 1,25,2+2*A,PT$'DMPJ
340 GOSUB 920:PRINT TAB(9)RED$"START
     A SONG ENTRY":PRINT'ELQK
345 PRINT TAB(1)YEL$"1. USE DEFAULT
     VOICE PARAMETERS"'CGYQ
350 PRINT TAB(6)"(PIANO WITH NO
     FILTER)":PRINT'DDVK
355 PRINT TAB(1)"2. SET NEW VOICE
     PARAMETERS":PRINT'DDJQ
360 PRINT GRN$:CHAR 1,10,9,SO$'CPKH
365 GET KEY A$:A=ASC(A$)-48
     :IF A<1 OR A>2 THEN 365'KSSS
370 ON A GOTO 375,405'CIPG
375 CHAR 1,33,1+2*A,PT$:GOSUB 925'EQKP
380 VO$(1)="V1 T0 X0":VO$(2)="V2 T0
     X0":VO$(3)="V3 T0 X0"'DUBQ
385 PLAY VO$(1):PLAY VO$(2)
     :PLAY VO$(3)'DXSR
390 PRINT RED$TAB(5)"DEFAULT VOICE
     PARAMETERS":PRINT'DHXQ
395 FOR I=1 TO 3:PRINT GRN$;
     TAB(5)"'PLAY' STR$("I")= "VO$(I)
     :PRINT:NEXT'HUJX
400 SLEEP 2: GOTO 450'CGAA
405 REM *** SET NEW VOICE PARAMETERS
     ***'BCCK
410 CHAR 1,33,2+2*A,PT$'DMOD
415 GOSUB 925:PRINT TAB(3)"SET NEW
     VOICE PARAMETERS":PRINT'EHJO
420 FOR I=1 TO 3:PRINT
     TAB(3)"VOICE"I"ENVELOPE #(0-9)...
     ";:GOSUB 830:T$=B$'HRUN
425 PRINT TAB(3)"VOICE"I"FILTER
     ON/OFF(1/0)... ";:GOSUB 830
     :F$=B$'ENYQ
430 VO$(I)="":VO$(I)="V"+RIGHT$(STR$
     (I),1)+" "+"T"+T$+" X"+F$'KYQO
435 PRINT GRN$;TAB(3)"'PLAY'
     STR$("I") = "VO$(I):PRINT CYN$
     :NEXT'EUTQ
440 PLAY VO$(1):PLAY VO$(2)
     :PLAY VO$(3):SLEEP 2'EBKK
445 REM *** SET VOLUME & TEMPO
     ***'BVYM
450 GOSUB 930:PRINT TAB(5)RED$"SET
     VOLUME AND TEMPO":PRINT:PRINT'FMVO
455 PRINT TAB(2)YEL$"SET VOLUME
     (0-15)... ";:GOSUB 830:VM=VAL(B$)
     :VOL VM:PRINT'HWVW
460 PRINT TAB(2)"SET TEMPO (0-255)...
     ";:GOSUB 830:TP=VAL(B$)
     :TEMPO TP'GSPQ
465 IF FL=1 THEN FL=0:GOTO 120'FKMO
470 SLEEP 2:WINDOW 0,0,79,24,1
     :WINDOW 19,4,60,20:I=1'EFTO
475 DO:PRINT RED$CHR$(147)TAB(10)"***
     ENTER A NEW SONG ***":PRINT'FOAW
480 PRINT CYN$TAB(15)"ENTER MEASURE "I
     :PRINT:PRINT YEL$'EOCP
485 GOSUB 830:MS$(I)=B$'CMPO
490 I=I+1:LOOP UNTIL B$="END"'FGAN
495 MM=I-2:GOTO 120'DIYP
500 REM *** ADD NOTES TO A SONG
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```
     ***'BVWE
505 CHAR 1,25,2+2*A'DICH
510 WINDOW 0,0,79,24,1:WINDOW 9,4,60,
    20'CXHG
515 IF MM=0 THEN PRINT
    TAB(15)CHR$(15)"THERE IS NO SONG
    IN MEMORY"CHR$(143):SLEEP 3
    :GOTO 120'JWCW
520 I=MM+1:GOTO 475'DIKE
525 REM *** SET NEW VOICE PARAMETERS
    ***'BCCN
530 CHAR 1,28,2+2*A,PT$:GOSUB 920'EQKI
535 PRINT RED$TAB(5)"SET NEW VOICE
    PARAMETERS":PRINT'DHHR
540 PRINT TAB(7)YEL$"VOICE PARAMETERS
    ARE:"'CGUL
545 FOR K=1 TO 3:PRINT
    TAB(8)GRN$"VO$("K") = "VO$(K)
    :NEXT'GSMR
550 SLEEP 3:FL=1:GOSUB 415'DKAI
555 REM *** SET FILTER ***'BPKN
560 CHAR 1,20,2+2*A,PT$'DMKJ
565 GOSUB 920:PRINT RED$TAB(10)"SET
    FILTER":PRINT'EMMR
570 PRINT YEL$TAB(1)"CUTOFF FREQ
    (0-2047)?... ";:GOSUB 830
    :CF=VAL(B$):PRINT'GTET
575 PRINT TAB(1)"L/P FILTER (ON-1;
    OFF-0)?... ";:GOSUB 830:LP=VAL(B$)
    :PRINT'GPFY
580 PRINT TAB(1)"B/P FILTER (ON-1;
    OFF-0)?... ";:GOSUB 830:BP=VAL(B$)
    :PRINT'GPKU
585 PRINT TAB(1)"H/P FILTER (ON-1;
    OFF-0)?... ";:GOSUB 830:HP=VAL(B$)
    :PRINT'GPWA
590 PRINT TAB(1)"RESONANCE (0-15)?...
    ";:GOSUB 830:RES=VAL(B$)
    :PRINT'GQMU
595 PRINT GRN$TAB(3)"FILTER"CF","LP",
    "BP","HP","RES'CRQV
600 FILTER CF,LP,BP,HP,RES'BQIE
605 SLEEP 3:GOSUB 925'CGMH
610 PRINT CYN$TAB(3)"YOU MUST TURN ON
    FILTER FOR":PRINT TAB(3)"VOICE
    USING ENVELOPE"EV;"USING"
    :PRINT TAB(3)"OPTION 7. DON'T
    FORGET!!!"'GPDE
615 SLEEP 4:GOTO 120'CGVI
620 REM *** RE-WRITE A SONG MEASURE
    ***'BBYJ
625 CHAR 1,25,2+2*A:WINDOW 0,0,79,24,1
    :WINDOW 19,4,60,20'FILR
630 IF MM=0 THEN PRINT
    GRN$CHR$(15)TAB(5)"THERE IS NO
    SONG IN MEMORY"CHR$(143):SLEEP 3
    :GOTO 120'JAOV
635 PRINT TAB(5)GRN$"THE HIGHEST
    NUMBERED MEASURE IS "MM:PRINT'DJKU
640 PRINT TAB(10)RED$"EDIT A SONG
    MEASURE":PRINT'DIIM
645 PRINT TAB(10)"ENTER MEASURE #...
    ";:GOSUB 830:I=VAL(B$)'FORT
650 WINDOW 19,4,60,20,1'BNTI
655 PRINT CYN$TAB(5)"THE NOTE STR$
    FOR MEASURE"I"IS:":PRINT MS$(I)
    :PRINT'EPSX
660 PRINT YEL$TAB(5)"ENTER NEW NOTE
    STR$...":PRINT'DHAP
665 GOSUB 830:MS$(I)=B$'CMPO
670 GOTO 120'BDCI
675 REM *** PLAYBACK SONG ***'BSJR
680 CHAR 1,22,2+2*A,PT$'DMMM
685 GOSUB 915:IF MM=0 THEN PRINT
    TAB(1)"THERE IS NO SONG IN MEMORY"
    :SLEEP 3:GOTO 120'IQFD
690 PRINT TAB(1)"PLAYING '";NS$;
    "'"'CHQO
695 IF SE=0 THEN 705'DGVR
700 FOR K=1 TO NR:ENVELOPE EV(K),
    AT(K),DY(K),SN(K),RL(K),WF(K),
    PW(K):NEXT'FXPP
705 FILTER CF,LP,BP,HP,RES'BQIK
710 VOL VM:TEMPO TP'CGTF
715 FOR K=1 TO 3:PLAY VO$(K):NEXT'FMBM
720 FOR I=1 TO MM:PLAY MS$(I)
    :NEXT'FNOJ
725 GOTO 120'BDCJ
730 REM *** SET NEW ENVELOPE ***'BUPJ
735 CHAR 1,25,2+2*A,PT$'DMPN
740 GOSUB 920:PRINT GRN$TAB(1)"YOU
    CAN CHANGE DEFAULT SETTINGS"'DKLR
745 PRINT TAB(7)"ON UP TO 3
    ENVELOPES"'CCTQ
750 PRINT:PRINT CYN$TAB(1)"ENTER HOW
    MANY... ";:GOSUB 830:NR=VAL(B$)
    :IF NR<1 OR NR>3 THEN 740'LEQY
755 SLEEP 2:SE=1'CGON
760 FOR K=1 TO NR:GOSUB 925
    :PRINT RED$TAB(8)"SET NEW
    ENVELOPE"'GPCS
765 PRINT YEL$TAB(1)"ENVELOPE #
    (0-9)? ....... ";:GOSUB 830
    :EV(K)=VAL(B$):PRINT'GWYB
770 PRINT TAB(1)"ATTACK RATE (0-15)?
    ..... ";:GOSUB 830:AT(K)=VAL(B$)
    :PRINT'GSGV
775 PRINT TAB(1)"DECAY RATE (0-15)?
    ...... ";:GOSUB 830:DY(K)=VAL(B$)
    :PRINT'GSDB
780 PRINT TAB(1)"SUSTAIN LEVEL
    (0-15)? ... ";:GOSUB 830
    :SN(K)=VAL(B$):PRINT'GSNW
785 PRINT TAB(1)"RELEASE RATE (0-15)?
    .... ";:GOSUB 830:RL(K)=VAL(B$)
    :PRINT'GSRC
790 PRINT GRN$TAB(1)"W/F (0=TRI -
    1=SAW TOOTH - 2=SQR)"'CGEU
795 PRINT YEL$TAB(1)"WAVE FORM (0-2)?
    ........ ";:GOSUB 830
    :WF(K)=VAL(B$):PRINT
    :IF WF(K)<2 THEN PW(K)=0
    :GOTO 805'LOEL
800 PRINT TAB(1)"PULSE WIDTH
    (0-4095)? ... ";:GOSUB 830
    :PW(K)=VAL(B$)'FRWO
805 SLEEP 2:NEXT:SLEEP 2
    :GOSUB 930'EKGL
810 PRINT RED$TAB(9)"THE NEW
```

```
    ENVELOPES":PRINT'DHIL
815 FOR K=1 TO NR:PRINT
    GRN$TAB(1)"ENVELOPE"EV(K)",
    "AT(K)","DY(K)","SN(K)","RL(K)",
    "'FLTX
820 PRINT TAB(1)WF(K)","PW(K):PRINT
    :NEXT'EOFJ
825 CHAR 1,10,15,"PRESS ANY KEY",1
    :GET KEY A$:GOTO 120'ERPS
830 REM *** INPUT SUB-ROUTINE ***'BWML
835 B$="":A$="":FM=FRE(1)'ELIP
840 GET A$'BCGH
845 PRINT CHR$(15)CHR$(164)CHR$(157);
    'EPKQ
850 IF A$=CHR$(27)THEN 120'EJRL
855 IF B$=""AND A$=CHR$(13)THEN
    B$=CHR$(143)+"-":PRINT B$;
    :GOTO 865'LXGY
860 IF A$=","OR A$=":"OR A$=";
    "THEN 840:REM PUNCT
    LIMITATION'IAYU
865 IF A$=CHR$(13)OR A$=CHR$(20)OR
    A$=CHR$(32)THEN 875'KVMX
870 IF A$<CHR$(35)OR A$>CHR$(93)THEN
    840'HPAQ
875 IF A$=CHR$(13)THEN PRINT CHR$(32)
    :RETURN'HLMU
880 PRINT CHR$(143)+A$;'DIVN
885 B$=B$+A$:L=LEN(B$):IF EE=1 AND
    B$="EXIT"THEN PRINT CHR$(32)
    :RETURN'MXAD
890 IF A$=CHR$(20)THEN B$=LEFT$(B$,
    L-2)'HPYS
895 GOTO 840'BDLR
900 IF EE=1 AND B$<>"END"THEN IF
    A$=CHR$(13)THEN 840'KOHN
905 REM *** SET COLOR & SIZE OF
    WINDOWS ***'BDXQ
910 PRINT YEL$:X1=35:Y1=1:X2=75:Y2=23
    :GOTO 935'GCBO
915 PRINT YEL$:X1=40:Y1=10:X2=67:Y2=12
    :GOTO 935'GDTT
920 PRINT YEL$:X1=35:Y1=3:X2=70:Y2=19
    :GOTO 935'GCDP
925 PRINT CYN$:X1=37:Y1=4:X2=72:Y2=20
    :GOTO 935'GCAU
930 PRINT GRN$:X1=39:Y1=5:X2=74:Y2=21
    :GOTO 935'GCDQ
935 REM *** WINDOW WITH BORDER S/R
    ***'BAXS
940 WINDOW X1,Y1,X2,Y2:PRINT
    CHR$(27)"M"'DRBN
945 X=RWINDOW(1):Y=RWINDOW(0)'ELAR
950 BT$="":FOR COL=1 TO X-1
    :BT$=BT$+CHR$(175):NEXT'JXIT
955 TP$="":FOR COL=1 TO X-1
    :TP$=TP$+CHR$(183):NEXT'JXYY
960 PRINT CHR$(147)CHR$(111);TP$;
    CHR$(112)'EUAP
965 FOR ROW=1 TO Y-1:PRINT CHR$(180);
    SPC(X-1);CHR$(170):NEXT'KXHA
970 PRINT CHR$(108);BT$;CHR$(186);
    :PRINT:PRINT:RETURN'GTRR
```

END



*Continued from pg. 88*

```
    :NEXT'GMLL
390 PRINT"[DOWN3]DON'T FORGET TO SAVE
    THIS PROGRAM!"'BAMP
400 POKE 198,7:FOR A=631 TO 637
    :POKE A,13:NEXT:PRINT"[HOME]"
    :END'IVMH
410 DIM PR$(144),LE(144)'BQUC
420 FOR B=830 TO 874:READ C:POKE B,C
    :NEXT'GOCG
430 FOR A=0 TO L:READ PR$(A),LE(A)
    :NEXT'FRIH
440 PRINT"[CLEAR,BLACK]";
    :FOR B=0 TO 23:IF B>L THEN
    460'HMMK
450 PRINT TAB(9)LE(B)TAB(14)PR$(B)
    :NEXT'ERIJ
460 CH=0:RE=18:CO=5:PRINT"[HOME]"'ENQJ
470 PRINT"[UP]"TAB(10)"[SPACE21,
    LEFT21]";'CEPX
480 PRINT CHR$(RE)CHR$(CO)MID$(STR$
    (LE(CH)),2)TAB(14)PR$(CH)'GFQQ
490 FOR A=1 TO 40:GET A$
    :IF A$=CHR$(17)OR A$=CHR$(13)OR
    A$=CHR$(145)THEN 530'OFRW
500 NEXT A'BBTY
510 IF RE=18 THEN RE=146:CO=144
    :GOTO 470'GTKI
520 IF RE=146 THEN RE=18:CO=5
    :GOTO 470'GRQI
530 RE=18:CO=5'CIAF
540 IF A$=CHR$(13)THEN 660'EJVH
550 PRINT"[UP,BLACK]"TAB(9)LE(CH)TAB
    (14)PR$(CH)'DSBL
560 IF A$=CHR$(17)THEN 630'EJWJ
570 CH=CH-1:IF CH<>-1 THEN 610'HMNN
580 CH=L'BDLI
590 IF L<24 THEN FOR B=1 TO L:PRINT
    :NEXT:GOTO 470'JMAQ
600 PRINT"[CLEAR]";:FOR B=CH-23 TO CH
    :PRINT TAB(9)LE(B)TAB(14)PR$(B)
    :NEXT:GOTO 470'KGDN
610 IF PEEK(214)=1 THEN SYS 830'FJWF
620 PRINT"[UP2]":GOTO 470'CEBF
630 CH=CH+1:IF CH<=L THEN PRINT
    :GOTO 470'INPL
640 CH=0:IF L<24 THEN PRINT"[HOME]"
    :GOTO 470'GLVK
650 GOTO 440'BDHG
660 PRINT"[CLEAR,DOWN3,RVOFF]
    LOAD"CHR$(34)PR$(CH)CHR$(34)",8,
    1"'DPXO
670 POKE 198,5:POKE 631,13:POKE 632,82
    :POKE 633,85:POKE 634,78
    :POKE 635,13'GPOS
680 PRINT"[HOME]":END'CBBJ
690 DATA 162,240,189,167,6,157'BVKN
700 DATA 207,6,202,208,247,162'BVUF
710 DATA 240,189,183,5,157,223'BVFG
720 DATA 5,202,208,247,162,240'BVQH
730 DATA 189,199,4,157,239,4'BTUI
740 DATA 202,208,247,162,200,189'BXVJ
750 DATA 255,3,157,39,4,202'BSEJ
760 DATA 208,247,96'BKDJ
```

END

by Graham Kinsey

# Amiga Public Domain Software




ED SAUK

The graphics capabilities of the Amiga are the reason why many people bought the Amiga. Another sizable number of Amiga purchasers bought the Amiga to write their own programs. Put them together, and it is only natural that graphics programs make up a large amount of the Amiga public domain library.

From the truly dazzling programs that make some commercial programs seem bland to the recent proliferation of graphics display hacks, here is the most important of the lot. For each program, the author is given, whether the program is available on the Fish series or the AMICUS series, and includes the number of each series. In many cases, more than one disk will be listed in each series for a given public domain program. This means that an update to the program has been released and is also available on one of the mentioned disks in the series.

I do not keep track of which programs are available on PeopleLink here since virtually all of the programs mentioned will be available on PeopleLink's Amiga Zone by the time this is published. When a public domain program has been classified as shareware, I note the suggested donation.

**Gad**: by John Draper (Fish 1; AMICUS 1)
This program simply demonstrates the various types of gadgets possible under Intuition.

**Halfbrite**: by Bob Pariseau (Fish 1; AMICUS 1)
This program is the only test to see whether your Amiga is capable of a special graphics mode that not all Amigas can display. This special graphics mode is called Extra-Half-Brite mode. Basically, this mode allows you to display a 320 by 200 display with 6-bit planes, and have up to 64 colors displayable at once and every color is usable at any pixel (this has nothing to do with hold and modify). Now it is true that all Amigas have only 32-color registers from which to select colors. The extra 32 colors are created by dividing the red, green and blue values in half (rounding down). About the first 20,000 Amigas produced didn't have this option (I am one of those owners), but all the rest of the Amigas should have this special mode built into the Denise chip. At the moment I am not aware of any program (public domain or commercial) that uses this special mode, but maybe someday somebody will take advantage of Extra-Half-Brite mode.

**Mandelbrot**: by Robert French (Fish 4,5,31)
by Thomas Wilcox (Fish 21)
There are two different versions of Mandelbrot generators available in the public domain. Both programs do basically the same thing, although there are a few differences. Wilcox's Mandelbrot Set Explorer (MSE) makes full use of Intuition menus, while French's Mandelbrot version 3.0 is command-line oriented. Both programs offer extensive on-line help. MSE has a bunch of screens as menu options, while Mandelbrot 3.0 has a multi-layered help file. Both support all the major graphics modes, but Mandelbrot 3.0 also will work in hold and modify mode. Both allow such options as resizing the size of the display (important, since plotting a full screen mandelbrot can easily take over half an hour or more), changing the color palette, save and load both pictures and color palettes, and zooming in on any point in the current mandelbrot plot. MSE will allow you to plot only a part of a mandelbrot set and then save it, so that you can finish it later. Mandelbrot 3.0 has more a more extensive set of options for manipulating mandelbrot plots, including manipulation of only the real or imaginary part of the plot, or both.

**Moire**: by Scott Ballantyne (Fish 9; AMICUS 1)
This simple program draws moire patterns in 640 by 200 mode. A three-dimensional perspective is attempted, and the user can ask the program to re-draw a screen at any time. Each time the infinity point is randomly chosen.

**SetLace**: by Bob Pariseau (Fish 9; AMICUS 1)
This program will force the screen to interlace mode. It is important to note that running SetLace will not double the amount of rows of text displayable, nor in any way alter any Workbench or CLI display. The only benefit of this program is to fill up the black lines between the non-interlaced scan lines.

**3DCube**: by Paul Curtis (AMICUS 8)
This Modula-2 demo shows a rotating, three-dimensional cube. The cube moves back and forth between close-up and far away distances. One warning—there is no way to end this program. It is even impossible to put the 3DCube screen to the background. Essentially, this program kills any multitasking possibilities.

**Amiga3D**: by Barry Whitebook (Fish 12)
One of the early animation demos, when Amiga3D is run, you will see a 3D rotating sign with the word AMIGA on the front. An undocumented feature of this particular demo is that you can use a joystick plugged into the second port to move the sign in any of the three dimensions. This demo is not very smooth; there is noticeable jitter.

**Arrow3D**: by Steve Beats (Fish 12)
Another animation demo, this one rotates a 3D wire frame arrow in all three dimensions. This demo uses a 640 by 400 screen.

**Blobs**: by Peter Engelbrite (Fish 15)
This demo is based on the Unix worms demo. Several colored

trails are created, and will either wander around aimlessly or run towards the mouse pointer, whichever option you enable. The trails grow on the front end and disintegrate at the back end.

**Multidim**: by Robert French (Fish 18)

This program will first create a wire-frame of a cube. The number of dimensions the cube is represented in can vary from only two to as many as six. Once the cube has been created, it can be rotated in any of the represented dimensions by a joystick.

**Jay Miner's slides**: by Jay Miner (Fish 19)

These are a bunch of 640 by 400 IFF pictures created by Jay Miner (designer of the Amiga's custom graphics chip-set) to explain the structure and workings of the Amiga. Please note that the pictures are not designed for an absolute novice, especially one unfamiliar to the inner workings of computers in general.

**Hypocycloids**: by Terry Gintz (Fish 27)

Here is a computer version of Spirograph. Among the choices Hypocycloids allows you to make are the radii of the inner circle and the outer circle, how much the figure will rotate after the first iteration, whether the figure will grow or shrink as it is drawn and by how much. You can also decide whether the ends of the object appear pointed or rounded. And any figure can be saved as an IFF file.

**LinesDemo**: by Barry Whitebook and Commodore-Amiga (Fish 27)

This demo demonstrates a superbitmap window. When run, you will see the ordinary lines demo from the Workbench disk, but with two scroll bars as part of the window border. Even when the window is resized to the size of the whole screen, you will notice that you cannot see all of the lines at once. This is because the actual size of the window is 1024 by 512 pixels. Note that this demo is identical to the new lines demo which appears on version 1.2 of the Workbench disk.

**Rubik**: by Bill Kinnersley (Fish 29)

When you run this, you get what you might expect—a rubik's cube appears on the screen and immediately the cube's colors start to be scrambled. If you watch the program long enough, you will eventually see the cube's faces unscrambled and eventually the colors will be brought back together. The animation in this demo looks very smooth because the author uses double buffered animation techniques. Double buffering means that all drawings are done in another area of memory, and only the end result is shown to the viewer on the screen.

**Tree**: by Robert French (Fish 31)

A tree will be drawn when this program is run using recursive methods. The graphics mode for this program is a 640 by 200 pixels, with four bit-planes.

**VDraw**: by Stephen Vermeulen (Fish 31,38,52; Shareware: $20)

Based on the ancient public domain drawing program Freedraw, VDraw has grown tremendously. VDraw is now arguably more powerful than the old commercial program *Graphicraft*. Earlier version of Vdraw implemented a menu interface, but as of version 1.19, VDraw now uses a totally iconic interface. Unlike *Deluxe Paint*, VDraw has the icons for the major options on the bottom of the screen. When clicking on a command icon, any options for that command will appear as a set of icons on the right edge of the screen. VDraw supports all the basic drawing options you would expect, like boxes, circles, arcs, different line patterns, magnify, being able to enter text in any area of the screen. You can change the font for text entering at any time. You can cut out a piece of the picture and use it as a brush. Air brushes are supported, with proportional gadgets for both area and density. You can lock any area of the screen to prevent accidental erasure. Another important part of VDraw is the profile file, which holds many parameters that can be changed. The resolution and number of bit planes can be set from here. The aspect ratio of the pixels can be changed. If you wish, you can create a superbitmap of any size, and then scroll through the picture when VDraw is running. On a related note, you can even enlarge the size of the screen, and use the overscan area to be able to see a larger portion of a superbitmap at a time. (Keep in mind that Intuition will not allow you to move the pointer into the overscan area.) The refresh rate of the zoom lens can also be changed.

**MacView**: by Scott Evernden (Fish 32,35)

Thanks to MacView, Amiga owners can now view and use any picture generated on the Macintosh. MacView will let you view a Mac picture in either 320 by 200 or 640 by 400 mode. You can also save any Mac picture as an IFF file for later editing by your favorite paint program.

**Spin3**: by Ronald Peterson (Fish 32; AMICUS 12)

Another example of double buffered animation, when Spin3 is run you will see three rotating cubes. The cubes are also bouncing inside a room, and the program gives a three-dimensional appearance, as the cubes will appear to bounce off the inside of the monitor screen from time to time. After Spin3 has run for about a minute, all the colors will begin to cycle, and the previous images of each cube will no longer be erased.

**Stars and 3DStars**: by Leo Schwab (Fish 33)

Both programs produce a moving star field. There are two parameters that can be changed at run-time. The first is the depth of view and the second is the speed at which the stars fly by. 3DStars required red and blue 3D glasses to achieve the 3D effect.

**Bigmap**: by Leo Schwab (Fish 33)

When run, this program will produce a very large window. To scroll through the superbitmap, use a joystick that is plugged into the second port. The size of the superbitmap is 960 by 600, although it may appear to be much bigger.

**Oing and Sproing**: by Leo Schwab (Fish 33; AMICUS 14)

These programs are the oldest children of Boing. Oing is basically a sprite version of Boing. Oing will create six tiny boing balls, and all of them will proceed to bounce all over the place. Unlike Boing, Oing does not open its own screen, so these boing balls will be bouncing on top of whatever is already on the screen. Sproing adds an audio portion to Oing. The net sound effect of Sproing almost sounds like the fourth of July!

**YaBoing**: by Ali Ozer (Fish 36; AMICUS 14)

Another Boing child, this program is a game of sorts. The object is to catch the red and white oing-sized boing balls with your pointer, while avoiding the green and white boing balls.

**Zoing**: by Alonzo Gariepy (AMICUS 14)

Yet another Boing child, this demo has more to do with physics than anything else. When the program starts up, seven balls

appear on the screen. They will immediately begin to bounce around the screen. But these balls have a different look than normal boing balls—two of them have happy faces permanently on them. The other five have similar faces, but their smiles are not permanent. They can be changed by the face that is controlled by you via the mouse pointer. Your face is a stern one, and it can make the other five turn unhappy as well. As for the physics part of this program, your ball has total inelasticity and infinite mass, so that whenever one of the other faces hits yours, you do not move. If you are not moving as well, the colliding ball loses some energy. If you are moving towards the colliding ball, you will add energy to it. The number of extra faces can be varied at run-time, as well as the strength of the gravity field (which will pull all faces except your own towards the bottom of the screen).

**CSquared**: by Bill DuPree (Fish 38; AMICUS 14)
Mathematically-oriented, this program produces results much quicker than any Mandelbrot program can. CSquared can operate in either 320 by 200 or 640 by 400 mode. All important parameters can be altered from within the program, as well as the color palette.

**The VAX Pictures**: (Fish 39,44)
If you haven't seen these pictures before, you might be overwhelmed! These pictures were originally created on a VAX 11/780 using a ray tracing program. The pictures were then ported over to the Amiga. The pictures are all displayed in interlaced hold and modify mode, for 320 by 400 resolution and up to 4,096 colors.

**STEmulator**: by David Addison (Fish 43)
No, this program doesn't really do what you might think it would do. When run, a low-resolution Atari ST GEM screen will pop up. Eventually, when you try to do something, the ST screen will crash.

**3d-Arm**: by Bob Laughlin (Fish 47)
This program is the first stage of a desired goal-directed animation of a simulated 3D robot arm. The arm can be displayed as a wire-frame or as a solid figure. The arm has three joints from which movement is controlled at the shoulder, elbow and wrist. Animation can be programmed by inputing delta values for each axis that each joint can move through. Once these values have been input, the program can simulate animation by showing rotation of the arm at certain intervals. To help with setting the delta values for rotation, all of the joint axes can be displayed along with the arm. There are six different angles from which to view the arm and two different depths. Also, a fly-by mode can be turned on and the arm will appear to rotate all at once before you.

**Juggler**: by Eric Graham (Fish 47,57; AMICUS 16)
Without a doubt, Juggler is at the moment the best public domain graphics demo for the Amiga. Basically, Juggler is a very short movie consisting of 24 frames which are displayed quickly in succession. But what makes Juggler so spectacular is that the frames are hold and modify pictures. Each of the frames was created by Eric Graham with a ray tracing program that he designed for the Amiga. But the wonder doesn't stop there. HAM pictures normally take up 48K bytes of space each. If all of the frames were in memory at once, they would together take up over 1 megabyte of memory, and therefore the program could not run on an Amiga without some extended memory. Eric has come up with a brilliant compression/decompression scheme. First, all of the frames are compacted down to a mere 10K bytes of space each. Then when the program runs, each frame in turn is decompressed to its original size in under 30 milliseconds. There is rumor that Eric will eventually release his ray tracing program as a commercial product. When he does, we can expect to see even more spectacular HAM movies, since many Amiga users out there now have over 2 megabytes with which to store the HAM frames (for an Amiga with 2.5 megabytes available, that works out to 250 frames!).

**Plot**: by Terry Gintz (Fish 49)
This program plots three-dimensional functions. Actually two versions of the program exist. The first can display the function plot in a 640 by 400 window. The other plots functions in a 320 by 200 window. Only when running the low-resolution version can you save the plot to disk. A new formula can be input at any time. However, the program only supports the four basic operators and trigonometric functions. The support for parenthesis is limited. Rotation values for both the X and Z axes can be altered. Also the aspect ratio can be changed, as well as the magnification factor.

**Sizzlers**: by Greg Epley (Fish 50; AMICUS 15)
Contains five separate 640 by 400 graphics demos. A help screen is provided. Sizzlers is one of the few public domain programs not to be written in C; rather it is written in Modula-2. This demo is not for those who cannot stand interlace flicker.

**HAMpoly**: by John Olson (Fish 52)
In this demo polygons are drawn in HAM mode and colored using patterns. The patterns make it possible to display any of the 4,096 colors. The drawback to the pattern method is that smooth edges aren't usually possible, since sometimes up to three pixels are required to change from one color to another.

**Dissolve**: by Lee Robertson (AMICUS 15)
Using Dissolve to display an IFF picture file gives is a very pleasing look. When Dissolve is run, the IFF picture is built up pixel by pixel until the whole picture is on display. The speed of dissolve can be altered at run-time.

**Tracer**: by Friedrich Knauss
This program is a ray tracer generator. This program will only generate spheres for objects, although you can vary the radius of any sphere, as well as the index of refraction. Up to a 150 balls can be produced in one ray tracing. The output of the program is 640 by 400, with 16 different shades of gray. You can use a bitmap of any IFF picture for the background. There is an anti-aliasing feature available, but don't use it unless your prepared to leave your Amiga alone for a couple of days! Please note that the original version refused to work with version 1.2 of the operating system, but this problem has been fixed.

**Ing**: by Leo Schwab (Fish 54)
Another in the long line of Leo's graphics display hacks, when this is run from CLI, a small title bar will appear and immediately start bouncing around the screen. But what is really interesting is that if you have Workbench loaded, and then run Ing, not only will the Ing title bar start bouncing around the place, but any disk or drawer windows that have been open will start bouncing around as well (this includes anything and everything that is inside each of the windows). But the fun isn't over yet! To kill Ing, you must be able to double-click the close gadget on the

Ing title bar. It isn't easy!

**Aural**: by Visual Aurals

This program is a demo of what will eventually become the software end of a music-to-graphics conversion hardware device. Since there is no way to enter music data into the demo program, the authors have decided to use delta values for the mouse instead of audio. When one of many options within the demo is executed. any movement of the mouse results in bizarre yet beautiful graphics displays. This program is so wierd that further comment would be of no use, so I suggest that you try it out on your own.

**mCAD**: by Tim Mooney (Fish 56; Shareware: $20)

mCAD is a drafting program, along the lines of *Aegis Draw* and *Aegis Draw Plus.* mCAD uses a 640 by 400 four-bit plane for its screen. (Be careful with memory usage, for mCAD does not check this and will abruptly crash if it cannot obtain the memory that it requires.) mCAD has the basic line, box, circle and arc drawing functions that you would expect. As for text, you can size a box to achieve the size and aspect ratio you desire. Zoom and slide features are available. The grid and the X-Y axes can be toggled on or off at any time. Coordinates can be called up (both absolute values, and delta values relative to any point of the screen that you select), and the density of the coordinate system relative to the grid can be altered. Objects can be rotated, either in plus/minus 90 degree increments or by user-selectable values. Drawings can be plotted out on any Hewlett-Packard compatible plotter. Drawings can also be saved. Drawings are saved in a simple ASCII format; therefore you can edit and even create you own drawings with any text editor. On a related note, all the shapes for the text characters are stored in a separate file, which is same as the method for saving pictures. So by editing this file, you can in effect create your own fonts.

**DBW-Render**: by Dave Wecker

This program is truly a gem. This ray tracer is an Amiga port of the ray tracing program on the VAX that created the interlaced HAM ray traced pictures. DBW-Render is very flexible and very powerful. As for the basic output, the user can choose from two resolutions, either 320 by 200 pixels or 320 by 400 pixels. For either resolution, the number of colors used can be either 32 or 4,096 via HAM mode. The program uses artificial intelligence heuristics to substantially reduce the time needed for computing each ray traced image. As a result of this, a standard Amiga is able to compute an image almost as fast as a VAX 11/780! If the speedup is still not fast enough for you, then you can choose to only work on a piece of the ray tracing at a time. Another important variable that can be user controlled is the resolution of the tracing, or how long you will allow it to work. The longer the time, the better the end result. If you choose to work on a tracing a piece at a time, you may want to devote a high-resolution time to any piece that contains a light source, for light sources can look pretty lousy if you skim right by them. Fractals can also be used to compute the edges of a surface, with variable parameters as to the characteristics of the surface. DBW-Render can draw four basic geometric objects: spheres, parallelograms, triangles and flat circular rings. Two different light sources can be used: spherical sources and parallel rays (sources from an infinite distance). Not only can indexes of refraction be input for any object, but a texture can be input for a surface. The textures available are wood, marble, snow, bricks and water. I have just touched on the complexity and power of DBW-Render, so be sure to check it out for yourself.

**Rainbow**: by John Hodgson (Fish 58)

Put a little color into your life. When executed, the background color is replaced by a rainbow of colors. Need I say more?

**Tilt**: by Leo Schwab (Fish 54)

An answer to the hideous guru meditation message. When Tilt is run, the screen immediately tilts to the left. A split second later, that nasty flashing red box appears, but instead of the normal error message, only the word "Tilt!" appears. Perhaps the best part of this demo is that with a double-click of the mouse, all returns to normal. If only all gurus could be double-clicked away...

**Robotroff**: by Leo Schwab

Don't run this program if you don't like playing around with your pointer! When you run this program, eventually one of three little characters from the arcade game Robotron will start charging towards your pointer. One of the three demons that might come is a Hulk. A Hulk will only pick up your pointer once he gets to it, and then proceed to carry it to the edge of the screen. The other two demons are Grunts, and they will start running towards your pointer. If they get to it, then your pointer will temporarily be destroyed. Once you start to run Robotroff, these creeps keep coming after you at regular intervals.

**Nart**: by Leo Schwab

This basically is another lines demo, but this one is very fast, and the color cycling speed is dazzling. But don't watch it for too long, you might go crazy...

**MWB**: by Matt Dillon:

Have you ever wished for more room from which to place your Workbench windows? Well, thanks to MWB, you now can have more than one Workbench screen at once. You can at any time tell MWB to force any subsequent OpenWindow() calls by any program to be routed to the new Workbench screen.

**Shadow**: by Jim Mackraz

This program is extremely useful for those who have multiple windows up. This program will create a shadow behind each and every window. The shadows cast are not totally black; you can read the contents of a window that has a shadow cast on top of it. The only problem with having shadows is that is takes much longer to move move windows around the screen.

**Melt**: by Stephen Coy

Another amusing display hack, this program will cause the content of any screen to literally melt away!

**DK**: by Tom Handel

You could say that this display hack is the antithesis of Dissolve. When DK starts, slowly but surely, each and every pixel on the screen will detach from the rest of the display, and gently fall to the bottom of the screen. If you're patient enough, all you will see is a big pile of snow at the bottom of the screen.

Next month I will be delving into Amiga public domain games. You don't have to shell out $30 to $50 to entertain yourself. As always, I can be reached in the Amiga Zone on PeopleLink (G KINSEY) or on the IDCMP BBS (617-769-8444, 8pm-8am). If you have written a public domain/shareware program or have obtained one that you think is worth mentioning to all Amiga owners, please feel free to contact me. C

## Software Reviews/Starglider

*Continued from pg. 26*

only by colorful alien ships. I particularly liked the planet's horizon line — fading white dots representing smoldering Novenian cities.

As you tear up the landscape in your AGAV fighter, keep a close eye on your force shields, energy level, and laser cell status. There are four Repair Depots left intact on the planet surface. These strange revolving structures require a careful approach to enter (much like docking with space stations in *Elite*). Once inside, your craft is safe from attack and its systems fully recharged. Write down each depot's sector coordinates and don't hesitate to retreat from battle. You are given only one life per game, so don't take chances.

At higher game levels, the energy available from Repair Depots begins to dwindle. To maintain a full supply, you must locate active Energy Towers and recharge from their pulsating power lines. This procedure is one of the many visuals highlighted in the game. The Egronians, however, will study your tactics and begin to disable the Towers. You must not let this happen.

Another knockout special effect comes with the launch of each video-guided missile. The heads-up display switches to a smaller view as seen from the speeding projectile. These missiles are your only weapon against several alien units. They are also quite effective as long-range reconnaissance probes.

One of your greatest strengths in the game is the ability to out-run the enemy. Use this power for quick strikes, but remember that speed decreases overall maneuverability. To turn faster, come to a dead stop (preferably out of enemy range). Although your craft can land on the planet surface, increase altitude before applying thrust to avoid damage to your shields.

The game's major weakness is lack of disk access. You are not allowed to save games in progress or high scores. The game's play guide booklet is also an uneasy blend of fact and fantasy—many of the features it describes simply do not exist. Your best bet is to play the game and reread the novella, jotting down clues as you encounter them.

*Starglider* is a puzzling game that grows stronger as each layer of mystery unravels. The challenge increases steadily throughout, with a final conflict just enough out of reach to keep you coming back for more. ■

## Software Reviews/Artworx Games

*Continued from pg. 24*

challenge is very similar to a friendly game of volleyball at the beach—just like the title suggests.

*Equestrian:* As you would expect, this program simulates the horseback sport of the rich—horse racing over a steeplechase. The program offers a dozen different courses to compete on and also includes an option for designing your own course. One to six riders can compete with each other and the clock. High scores are recorded on the display scoreboard and a disk file keeps track of all time winners of each course. The screen is divided into three windows, the largest of which displays you upon your horse and a portion of the race course. Another window displays a symbolic layout of the entire course and the final window records your score and the name of the competing horses.

A year ago, games of the quality found here would have fetched twice the price asked by Artworx. It is apparent that the reason these five are offered at a bargain price is not because they are second rate. Only two years ago, almost anything packaged right and offered to a game-hungry audience would sell; now consumers are more selective. This is good news. The quality of programs is going up, the selection is increasing, and the price is falling.

The result is good software offered at an affordable price. This is the case here. Artworx also offers a variety to choose from. Except for the karate simulation, I haven't seen any games which treat the same subjects. *Highland Games* and *Equestrian* games aren't for everyone, but at these prices you can risk trying something different without breaking your home budget. My pick for non-stop action was *Police Cadet* and *Thai Boxing*—for the dollars, these two pack as much action as anything I've seen.

Don't expect to find graphics and sound effects here to match those of games like *Gunship* or *Uridium*, but those employed here are effective and create the atmosphere needed for each game. Most of the games create disk files to record high scores so friends can compete. Each also includes options for multi-play so two or more players can compete at the same time. I was impressed at the quality, playability and speed of each. Best of all, one of the games should be just right for players in every age or interest group.

If you are looking for good arcade fun at a non-budget busting price, these five from Artworx are worth considering. ■

*Continued from pg. 61*

disk. Only one track is used to write to, the other is a buffer. If the drive is further out of alignment, the drive wouldn't be able to load the program in the first place, so we don't expect to have any problems with the save-to-disk approach."

As Hendrick put his *Gunship* through its paces, his eyes almost twinkled with delight as the 3D graphics danced across the screen. "The most difficult part of the program was creating the new graphics. That was a real job. The results Andy Hollis got have never before been done even on the more powerful machines running at the speed of a flight simulator, much less on the 64," said Hendrick.

"We think the use of teams to produce programs is the most effective way. We have artists to design the graphics. I'm a game designer; my job is to keep the programmers coordinated, tell them what their goals are, how the game is supposed to operate, feed them data, and so on. For instance, when Hollis was creating the programming systems for the 3D graphics, someone had to work out how all spots around the world would look. What would the terrain in southeast Asia look like as a helicopter flew over it? As a game designer, it was my job to decide that. I ended up doing that part of *Gunship* myself. My job is like being a conductor of an orchestra." (Said like a true musician, I thought.)

As is true of almost every profession, specialization is the soup of the day. Hendrick explains, "We hire artists to conjure up the graphics for our products and leave the code to the programmers. There are just so many hours in a day and days in a year. We want the programmer concentrating on the action and an artist to concentrate on the graphics. Now, on *Silent Service* Meier did the entire program and did a beautiful job, but since that product we've tried to free the programmers to concentrate on the program."

After seeing some of the pre-released routines and graphics, not to mention the speed, being coded for *Gunship* for the Amiga, I must agree that a team approach works—everyone does only what he does best, resulting in a product good in all categories.

The realism and power of the Amiga version of *Gunship* should impress more than the casual war gamer, it is being designed to impress the Pentagon as well. Schmidt explained, "We are working with the A.R.D. Corporation, a computer research and development company which is designing an instrument for the government which would monitor the performance of pilots of Apache helicopters (the one simulated in *Gunship*). The purpose is to determine when a pilot becomes incapacitated or disoriented. The device located in the pilot's helmet could monitor his reactions and send back sensory information to a central computer which would determine if the pilot was unable to fly the helicopter on his own. Either the computer or a central base could then take over flight of the helicopter and bring it back to base safely. Such a device would result in the loss of fewer of these expensive high-tech helicopters and their pilots.

"We're not trying to train fighter pilots or submarine captains. What we're trying to do is give people who will never have a chance to go inside a submarine the opportunity to get inside one and take it for a spin around the block to see what it is like."

"MicroProse fits into the development of such a device in stage two of its creation. Over the next two years, the company must develop a program which will accurately simulate the control of a real gunship so A.D.R. can test and create the actual monitoring device. The problem is to determine when the computer or home base should assume control of the craft. For instance, in a battle the pilot may be reacting to the situation around him and perhaps respond in a way which is not conventional, yet is proper. You don't want the computer to interpret the pilot's response as a failure on the part of the human pilot. A mistaken interpretation could be fatal. On the other hand, failing to realize when the pilot can no longer fly the craft would be just as fatal. The trick, then, is to know when to take over control and when to leave the pilot alone. The time to determine the normal reaction responses and body reflexes is before the pilot gets off the ground.

"With the completion of the Amiga version of *Gunship,* we should have a simulation which will accurately create the flight controls, atmosphere, battle conditions and speed of a real Apache Gunship in a battle situation.

"As the A.R.D. is developing their prototype monitoring device, they want to use our *Gunship* helicopter simulation (Amiga version) to develop the criteria by which they are going to monitor the pilots. In other words, they want to use this in a simulated environment which will very closely replicate the pilot flying the helicopter. They plan to use the different reality and skill levels of the game to monitor his motor skills, eye movements, emotional responses, blood pressure, and all kinds of other things, to put together the criteria to determine when he falls into an overload situation. Then they can construct the parameters of the actual computer device that will go into the helicopter."

Before I left, I asked Schmidt about what products the company will be shipping soon, his views on software piracy, and what the future holds for young programmers.

"MicroProse's roots are in realism, so don't expect to see it give fruit to any games based far from reality. You can always expect us to produce something which is based on some real life something or another, machine or whatever," said Schmidt. "The fine line we must walk is to produce software which is realistic, yet not so complicated the buyer can't understand it. That can be a challenge sometimes. If we error at all with our software, it is making it too realistic.

"We would like to think copy protection will disappear some day," continued Schmidt. "Copy protection is foolish and anything you set up that is copy protected is going to be broken—it just serves as a challenge. It is a vicious cycle. Copy protection just keeps the honest people honest. The bigger question is, how do you educate the marketplace? It needs to understand that to create and develop software takes a lot of developmental dollars. Someone has to pay for that, and if you're not buying the software, the company is going to go out of business.

"But we can't simply stop our efforts to prevent software pirates. They hurt our business. Millions of dollars are lost to the legitimate developer when unauthorized copies of a program are circulated. The only way to stop pirates is to combat it like narcotics. You go after the big pusher—the people who are doing it like a business, not the guy who's doing it for a few friends. The software publishers need to set an example by going after the big dealers. I'm not condoning anyone mak-

ing copies of copyrighted software, but if we are going to stop it, we need to go after the big offenders.

"If sales increase, prices can come down. So yes, if pirating was non-existent, more units would be sold and prices should fall accordingly. Researching, creating and distributing simulation games is expensive in time and, thus, in dollars. That's why they usually cost a little more than arcade games—it costs more to produce them. So when fewer units are sold, someone has to foot the bill for those expenses—it's not the pirater, it's the legal user who pays. I don't like that fact, you don't like that fact, and I'm sure the good fellow who buys our programs doesn't like that fact."

Okay, with the dirty subject out of the way, let's end the day with something good to look forward to—what's next for MicroProse, I asked.

"We'll be converting our existing programs for more machines. We expected to release *Destroyer Escort* after *Gunship*. It is a sort of the flip side of *Silent Service*—if you can't sink the destroyers from down below, maybe you can command a destroyer and get the sub from up above. But about three months into the development of the simulation, Meier just wasn't happy with the realism of the game so he put it on the back burner for a while.

"That means our next program will be called *Pirates*. It takes us into territory MicroProse has never gone before. It is a combination text, graphic, simulation, action game. [*Pirates* was released in May, 1987.] In the game, the player assumes the character of a seventeenth-century pirate. He can explore the world, meet kings and queens, gather together a crew to man his ship, fight sea battles, and engage in hand-to-hand combat.

"After that we will release *Red Storm* which is based on Tom Clancy's best-selling book *Red Storm Rising*. Meier will handle the software development and gaming duties while author Clancy and the book's technical/strategic collaborator, Larry Bond, will plot strategy and assist on military technical issues.

"After *Red Storm*, Meier should bring *Destroyer Escort* back to the front burner. There are other projects which we just aren't ready to talk about yet, but you can be sure they will be impressive entertainment," plugged Schmidt.

Before moving on to my last question, I asked if there would ever be a nuclear war simulation. "I don't think so," answered Schmidt. "Once you use nuclear weapons, the challenge has ended. It would make for a really quick game, so I don't see us doing such a simulation."

If war has to be fought, let's keep them inside microchips where the only statistics are the numbers calculated by the program; where the deadliest cost is the price of the software and the only danger is the loss of sleep trying to beat the computer.

Knowing there are thousands of enspiring programmers, I asked Schmidt if there is any future in creating software.

"Oh, definitely, there are job opportunities in programming. What the programmers need to decide is what aspect of the field they are most interested in—graphics, sound, action, arcade or business. We have a very stable staff here, but we are growing, so we are always interested in good eager programmers," he responded.

"Is there an educational requirement—college, tech school, Master degree?" I asked.

His answer surprised me and will probably upset some teachers, but Schmidt said, "None whatsoever. You just have to know your computer inside and out."

As I left, Schmidt suggested I stop by the airport on my way south. It seemed "Wild" Bill was bringing in a toy that afternoon— a Korean war vintage jet. "We figured if we were going to do so many flight simulations, it was only natural that we should have our own aircraft," added Schmidt.

It's a long way from Las Vegas to Hunt Valley, but the dream that was planted in the dry desert there six years ago has grown to full bloom in Central Maryland. Now those of us who have a desire to soar with the eagles, a craving for deep sea adventure, a yearning for risky adventure, or a primeval appetite for war and destruction, can safely live it. Like the ills released from Pandora's box, the disk packed with each MicroProse program holds a simulated challenge few will ever conquer but every true adventurer can enjoy.

Their products include flight, combat and war simulations. With the right product, you can battle your way across World War II Europe, kick up the sand in North Africa, sink convoys in the South Pacific, refight the battles of Vietnam, command an attack helicopter, or pilot a superfast minijet in marathon competition. That is only part of the adventures made possible because two men challenged each other with a simple bet. ■

## Software Reviews/Bureaucracy

*Continued from pg. 41*

*Bureaucracy* is basically divided into four parts: your town, the airport, on the airplane, and the jungle. Because of the immensity of the game and the large number of tasks ahead of you, map out the game—if not because of my suggestion, for your own sanity. I reiterate Infocom's warning in that you should not even bother mapping out the airport and the numbered rooms in the Zalagasan jungle. If you do, you're missing the true purpose of those places.

Now I have some hints from hindsight, so that you aren't totally helpless in playing *Bureaucracy*. Don't try to do things that are totally off-center. Pretend that you're really there and do what you would in real life. While in the town, don't waste too much time. You only have a short time to hop on the plane. Save the game often, so that you don't have to return to the beginning when you forget something.

As all of the rest of Infocom games are packaged with gimmicks pertaining to the game, so is *Bureaucracy*. It comes with a letter from your boss at Happitec, a humorous credit card application form, a skinny pencil, a membership application for *Popular Paranoia* magazine, and a brochure from Fillmore Fiduciary Trust, your bank. Examine these materials carefully! They will answer a number of questions that you'll be faced with in the game. That's a giveaway hint, by the way.

In the town, examine everything you find carefully. Don't worry about getting on the plane the first few tries. Just search every inch carefully and find the use of all objects, from the hacksaw to the computer cartridges. There are many doors and entryways to places, so examine them all. Don't expect the direct ways to do things to always work. Sometimes, a bell will ring on an easier method—another hint. Talk to all of the characters and listen carefully to all of the messages on your answering machine. It will take a while to get money for the airport cab, but once you do, you'll enter the meat of the game.

*Bureaucracy* proved its worth countless times in the course of play. In most text adventures, you try to avoid the mistakes. In *Bureaucracy*, I found myself trying to goof in anticipation of the witty response that would appear. Douglas Adams' humor, combined with Infocom's text adventure format, kept me entertained for many hours with interesting scenarios and the ability to laugh at myself and the world we live in. I never thought that rules could be so much fun. ■

## Software Reviews/Fleet System 4

*Continued from pg. 47*

most database programs, but *Fleet Filer* is written totally in machine language so the speed of operation is maximum and the space data takes is a minimum.

The enormity of the data specifications is enough to show you that *Fleet Filer* isn't a mediocre, run-of-the-mill program. You can have up to 5,000 records in a file. Each record can have up to 22 text or numeric fields of a maximum of 255 characters each. If this isn't enough to handle an individual's or small business's data, then you probably need a larger system.

Multiple calculations can be performed between fields and the results can replace existing data. This allows you to easily create tables of information about the records that you have. If this isn't enough, you can search by multiple fields through your data, only finding those records that match all of your criteria. I created 30 records and searched for those that satisfied a few conditions. *Fleet Filer* instantly responded with the two records that matched.

Not only are searches conditional, but the printing and saving of records are dependent upon the criteria you desire. All of these options combine to give you the ultimate ease in database use, with a minimum of manual reading. A tutorial in the manual steps the user through all of the commands used, as in the word processor, just as effectively.

The ability to create multi-column mailing labels will attract the small businessman with a list of clients that need mailers. Just put stick-on labels in your printer and *Fleet Filer* will do the rest. I tried this feature and was able to send friends postcards with the labels I made in a short amount of time.

Finally, *Fleet Filer* allows the input and output of data to and from *Fleet System* word processor files. This eliminates having to type data in the Extra Text area of the word processor. One simply has to enter this area and call up the *Fleet Filer* data to merge the information into form letters.

*Fleet System 4* thoroughly impressed me and should do the same for anybody with word processing/database needs. The package as a unit is the best offer I've seen in a while in the productivity category and I can only encourage those interested to give *Fleet System 4* a chance. It only took an hour or two to understand enough to begin working with the system and shouldn't take that much longer to master it. ■

## The Computer Revolution

*Continued from pg. 53*

listeners used stethoscope-style earphones to hear. Edison himself thought of his invention only as an office dictating machine. He quickly lost interest and devoted himself to the electric light.

Other inventors saw more potential. Seventeen years after Edison's invention, German-born Emile Berliner perfected a phonograph that used shellac disks instead of wax cylinders. A brilliant idea — a groove that spiraled in from the outside of a platter. The record album was born. Disks were more durable, sounded better, and took up less space than cylinder cans.

> "That's an amazing invention, but who would ever want to use one?" President Rutherford B. Hayes, talking about the telephone.

More importantly, disks could be mass produced. Before Berliner, the only way to get 100 copies of a song was to have the musicians play the song ten times in a row while ten Edison phonographs were spinning. With Berliner's process, it became possible to make one master of the recording and stamp out as many copies as were needed.

It would be 21 years after Edison's invention that the public became interested in listening to recorded music. It would be 27 years before you could buy a record that was recorded on both sides, and 48 years before you could buy a record player that ran on electricity. Fifty-one years after Edison, the first automatic record changer went on sale. It played the disk at the top of the stack first, and then pitched it into a rubber-lined box when the disk was finished playing.

The real revolution in the phonograph came in 1948, which was 71 years after Edison. Peter Goldmark at Columbia Records invented the long-playing (LP) record. By slowing down the turntable to 33-1/3 RPM and reducing the space between the grooves, he could jam 20 minutes of music into each album side. Before this, the playing time of a record was five minutes.

Again, this storage capacity is directly comparable to computer technology. In 1970, a 1K RAM chip was considered powerful. Then came the 4K chips, 64K chips,

256K chips, and now they're talking about 1 megabyte chips. As computers get more powerful, they become more useful and easy to use. When the long-playing record replaced the 78 RPM record, it gave people one more reason to put a phonograph in their homes.

And talk about your computer orphans! Over the years, music lovers have been forced to abandon their obsolete cylinder phonographs for disks (1887), their 78 RPM record collections for LPs (1948), and their monaural equipment for stereo (1958). And today the LP and the turntable itself are threatened by the compact disc player.

It may not seem fair that some of us have gone through the VIC 20 to the 64 to the Amiga, but it's not that Commodore is trying to rip anyone off. It's just the natural state of evolution for any developing technology.

The automobile, the airplane, the motion picture and the phonograph. These innovative technologies are all about 100 years-old. And yet, all of them are *still* evolving and being improved. When they were ten years-old—the same age the computer is today—they were primitive devices, ridiculed by the public, and far from perfected. While we gape with wonder at what our computers can do today, in the future we'll shake our heads with amazement about how we got along with those antiquated computers back in the 1980's. Save your computer for the museums of tomorrow.

So don't cry for the problems that rack the computer industry. Every one of these technologies went through the same stages. At first, they were only appreciated by a small subculture, while the masses failed to see any use or need of them. Then came the novelty period, when everybody flocked to witness the new technology and try it out. After the novelty period burned itself out, people invariably became bored and frustrated with the limitations of the new machine. Only after years of improvement and development did the invention reach the final stage—widespread public acceptance.

It's like starting a fire. First you need a spark (the spark of imagination or genius). Then you need lots of kindling (inventors, enthusiasts) that will catch that spark, flare up, and burn out quickly. With a little luck, they'll catch on to progressively larger pieces of wood (the general public), and eventually the fire burns on its own—as long as you feed it (further research and improvements).

"I've never heard of a revolutionary product accepted quickly," says Eric Arnum, an analyst with International Resource Development. "Some people would say that 20 years from invention to acceptance is normal."

Technology is known for moving fast, but in some ways it's slow, grinding, ponderous. Aspirin was invented in 1853, but it was 46 years before its value as a pain reliever was recognized. The ball point pen was patented in 1888, but it wasn't perfected or accepted by the public for 61 years. All inventions go through their equivalent of computer orphans, user groups, lawsuits, shakeouts, companies stealing secrets, and bankruptcies.

Despite what we read in the papers, after ten years the computer revolution is doing just fine. Its greatest achievements and innovations will be happening in the years ahead. And with *this* technology, we're lucky enough to be able to witness its history in the making.

The computer revolution has seen its Wright brothers, but it has yet to see its Lindbergh. It's seen its wax cylinders, but not its long-playing record. It's seen its Edison, but not its *The Jazz Singer*. Imagine the wonders that lie ahead! ■

## Music Mouse

*Continued from pg. 57*

bad. There's a lot to be said for the master or the great musician idea. The contribution of the single individual is still the most important thing in music. Now everyone may be able to make music for themselves, but it's still going to be true that some people will do it better than others—more people like to listen to this guy making music than that guy.

**Jones:** How will this affect the music that is produced?

**Spiegel:** It cheapens music-making just by making music much more plentiful. In the past, composing was an extremely difficult thing, requiring 20 years of studying written notation and theory. Anyone who could produce a repertoire was considered a composer. If it gets to the point where virtually anyone can generate a musical repertoire, then there's going to have to be some real attention to musical standards. Why do we like this repertoire more than that one? This throws the burden of establishing what is music by the content of the music rather than the fact that someone has mastered the techniques. I see that as potentially positive, but I won't know until something like that actually happens.

**Jones:** Where do you see us going from here?

**Spiegel:** There is no turning back the clock on this. I'm taking some large steps here by putting the ability to create music into the hands of as many people as possible. This gets it out of the elitist territories where it has been restricted. Music-making has generally been the province of people with a lot of physical coordination and the ability to read notes. Those are pretty artificial criteria for deciding who gets to be a musician. It should have something to do with the person's ability to express feelings and ideas with imagination and sensitivity.

**Jones:** You say that you are putting the power of the music back into the hands of the people, but isn't part of you in *Music Mouse*? Doesn't this mean that people will be playing as extensions of Laurie Spiegel?

**Spiegel:** The writing of algorithms is a personal thing. *Music Mouse* has a lot of my personality built into it. It won't be right for everybody and I don't expect it to be. Some people will absolutely hate it while others will love it. Hopefully, the people that don't like it will write other programs of this type and I may feel uncomfortable with them, but there is a lot of room for more programs of this type.

I have sometimes been called a visionary. When you talk about invisionment, it's partly being able to see something clearly in your imagination and flesh out all of the details, but it's also partly having spent a lot more time going back to this idea over and over and filling it in. It's brand new for most people to accept that an expert system can exist for an aesthetic application—that it's possible to facilitate the creative expressions with logical processes. It's scary to some people and exciting to others, but there aren't enough people who have thought about it enough how it is one or the other. Most people are talking, in general, about how computers will revolutionize this or that, but they aren't really trying to narrow it down to specific test cases. It's all very new and some of us have been playing with these things for a long time, but it's just a beginning.

*One of Laurie Spiegel's notable achievements was the computer realization of Johannes Kepler's* Harmonica Mundi, *which appeared on the* ***Sounds of Earth*** *record accompanying the Voyager 2.*

Music Mouse *is available from Opcode Systems, 444 Ramona, Palo Alto, CA 94301, 415-321-8977.*

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attack, decay, sustain and release; add portamento; increase phase distortion; synchronize the LFO; filter the frequency or envelope generator; and select much more to modify your sound. For those who have no synthesizer knowledge, these terms may seem confusing, but for those who own or program synthesizers, you can easily appreciate the power of the synthesizer inside the Amiga.

The Instruments screen is an exciting portion of the program. After you have defined a sound effect, you can immediately play the keyboard to hear the sound. There is no need to wait for the computer to set the sound tables! It is difficult to describe the Instruments screen, chiefly because it is similar to attempting to describe sound effects. Each slider is easily activated by the mouse and can be moved up or down several notches. The buttons such as On, Off and Ok are merely selected by the mouse as well. But the waveform can be changed by either selecting the waveform from a drop-down menu, or by actually drawing the waveform in the space allocated. A great amount of time in experimenting with this screen is essential before being able to create impressive sounds.

Yes, *Sonix* does support a MIDI option. You may enter up to eight recording tracks with each track handling 16 MIDI channels, plus change the MIDI presets for each channel. Although you can't play on a keyboard and expect the computer to place the appropriate notes on the staff, you can MIDI OUT any song. Of course you may connect several synthesizers, drum machines, guitar machines, mixing boards, digital delays...you name it! To activate MIDI OUT on *Sonix,* merely click on the Instrument icon and select MIDIPatch. Now all notes following that icon will be sent to your MIDI device. When you examine this MIDIPatch instrument file from the Instrument screen, one window will appear allowing you to change the MIDI channel, patch number and volume. Plus you can adjust the pitch bender, the modulation wheel, the octave of the MIDI device, and even the velocity. Indeed, *Sonix* is prepared to drive the most impressive pieces of music hardware available to date and produce recording studio-quality music. ■

## Tips

After working with Sonix for several months, I have discovered some hints that might help the new Amiga musician produce some impressive music, without real musical knowledge. Simply buy four-part music written for singers: soprano, alto, tenor and bass. You can then enter the soprano line into track 1, the alto line into track 2, tenor into track 3, and the bass line into track 4.

However, those who have more experience in music and are creative might enjoy entering piano music or original compositions. I recommend using track 1 as the melody line, entering the melody line by piano music, by ear, or sometimes both. Try to avoid using high, shrill sounds for the top voice. After listening to the original music on tape, record or compact disc, try picking out a suitable harmony line or make one up yourself that suits the style of music being entered. This line could easily be entered in track 2. Then, by either picking apart the original soundtrack or by reading piano music, enter the bass line in track 3 using a synth bass, a bass guitar or another similar instrument. Finally, develop a rhythm in track 4 and use the cut-and-paste options to repeat it through the song. I realize that this method is quite complex, but a musician with only a few years experience may be able to create superb music in this fashion, even though a majority of it will be entered by ear.

Drum rhythms are truly spectacular backgrounds for the music you enter. Even though you are only allowed to use four sound channels, the background drums play an important role in adding life to the music and making the music sound much more professional. Most drum rhythms can be developed in one track. Even though a particular rhythm may require the constant tapping on the cymbal while pounding the bass and snare, the three can be combined to still produce the desired rhythm. An example could be to use the bass, two highhat sounds, and then a snare.

Also, don't forget to use the tom drum. The tom drum is excellent for modern pieces which require drum fill-ins. Try a fill-in starting on the F above middle C and develop a pattern falling down to the middle C, the F below middle C, and finally to the C below middle C. Of course, several drum sounds together will sound very sophisticated. Don't be afraid to hit a snare drum on the highest line of the staff—it may sound more appropriate for the particular piece you are entering. There's a bunch of nice digitized drum sounds, use them!

Don't be intimidated by key changes in the song. Merely select the correct key signature when you start the song and enter until you reach the point where you change keys. From here, select another key signature and everything that you have entered will remain the same, but may be replaced with naturals, flats or sharps on the screen in order to be musically correct. Don't worry, everything you entered before will sound just as you had entered it in the original key! You might want to remember the drum fill-ins though. The drums, especially toms, change pitch as other instruments do. If, for example, you enter a tom fill-in and you are using the key of G, all F's will automatically be sharped. Once you reach the point in the song where you change to the key of C, all F's will remain as F's. Therefore, the drums will be played on an F sharp until the key change and then will drop a halfstep and be played as F, even though they were entered on the same line. This, of course, will not sound correct, since drums aren't changed in pitch in the middle of a song.

Even though a C two ledger lines below the bass clef is not the lowest note allowed to be entered, some instrument sounds will not be heard much lower. Also, when entering, if you wish to listen to what you have entered, you do not have to start from the beginning of the piece and listen straight through until you have reached that part. Instead, use the edit bracket and select the area that you would like to hear. Then click the PLAY command and the music will begin to play from where the edit bracket is.

Remember, the instruments are the most impressive parts of a song. Choose wisely and do not be afraid to create what is not there on the list. When possible, use as many different instrument sounds as you can. The greater selection of instruments, the more unique the song will become and the more people will enjoy listening to it. However, remember that digitized sounds require a considerable amount of memory. So, experiment to find the perfect instruments ahead of time and then take it away.

Don't be afraid to switch often between different sounds on different tracks. The computer can handle it and often the music will sound more sophisticated. If there is a rest in Track 1 and you know of a part that will sound good in that space but the other tracks are being used at that time, enter that quick little part in the rest time

with a different instrument if you desire.

Another interesting trait of *Sonix* is that it can run in the background of another program. Try booting the CLI and type "RUN SONIX" to execute the program. Once *Sonix* is loaded, load a piece of music and select the REPEAT option in the bottom playback buttons. Then use the gadget in the upper-right hand corner of the screen to flip back to the CLI. Type away and copy a disk while listening to your favorite tune! Or maybe invite a friend over, show off the Amiga's sounds, flip back to the CLI, and load directly the "Fields" demonstration and have that running at the same time!

One of the nicest features about *Sonix,* though, is its ability to read IFF-compatible sound files. You can easily load sound effects from *Deluxe Music Construction Set* and other programs as well as the instruments included on your *Sonix* Data Disk. And if you own a sound sampler, the number of sounds you can create and use is endless! One thing to remember about sampled sounds, in order to use them in *Sonix,* they must have an ".INSTR" file tag. Then, when you go to the Instruments screen and load the sampled sound, all that will be displayed is the actual waveform of the sound. In order to convert this to the standard RFF format for *Sonix* sampled sounds, merely resave the sound under a different name. The next time you load it, you will be able to change the sampled sound's ADSR, vibrato and phase distortion!

*Sonix* is definitely the beginning of a whole new era of computer music for the Amiga. Aegis appears dedicated to the Amiga and has done a tremendous job at completing and releasing this impressive music processor. The 248-page manual is complete with everything you would ever want to know about *Sonix,* music and sound synthesis. The book is so easy to use and well laid out. It even includes hints and tips of its own, plus step-by-step conversions of standard IFF sampled sounds to more complex RFF sampled sounds used in *Sonix*. And for those who don't even know much about music theory, the first chapters are dedicated to teaching you it!

There is little question that *Sonix* is the best music program for easy use and power. Aegis has done a superb job in releasing this long-awaited program and offers a way of upgrading as newer versions of Sonix develop. Truly, *Sonix* bring "your creativity center stage". C



*Continued from pg. 124*

In a nutshell, I give *Uridium* a score of 9.5 out of 10. I would prefer it include an option to save a game in progress rather than having to restart each time, but the game is well-designed, challenging, fast, and beautifully illustrated. The sound and graphic effects are never boring. The game should interest almost any age group.

*Uridium* is an arcade addict's fix. If not the best on the market, it is certainly in the competition. C

## Hints

Conquering any arcade game is like learning to play the piano—practice, practice, practice. But there are a few suggestions I can offer to help you succeed.

Don't hesitate to waste the lasers on your Manta fighter—they will never fail you. With rapid fire you can often clear a path in oncoming enemy squadrons while they are still out of view. Rapid fire can also explode homing mines which the mothership launches toward you.

Unless your memory is flawless, you'll never remember all the detail of each mothership's construction. To win you must be able to maneuver over the ship's bulkhead without crashing. I suggest you sketch the layout and trace a safe path to the runway on each you destroy for future reference. If you plan to see level 15, you'll need all the help you can get—so map the mother ships.

If you have a video recorder, you can record your missions by sending the video from the computer through the recorder before it goes to the screen. This way, you can leisurely study and sketch the surface of each mothership as well as spot details you should have strafed to increase your score. The recorded mission will also help you predict when and where enemy flight formation will appear so you can eliminate them.

To land, always approach the runway from the left and pass over it going right. If you level off, release the fire button and center the joystick handle. The Manta will land regardless of whether the landing signal is blinking.

If you want to leave your mark in the pilot's Hall Of Fame, fight instead of landing. Your score increases dramatically if you eliminate all the defending fighter crafts and strafe the entire surface of the mothership before landing. A high score will also result in additional Manta fighters being awarded for future use. If you intend to conquer *Uridium,* you'll need all the Mantas you can get your hands on. C

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large or complex file is uploaded, it may take the SYSOP a little while to catch up. Also, the template files cannot be created or processed during the weekends when users are on the system. As a result, some files may take a little longer than others to show up, so just be patient.

## Downloading

On the other hand, you should always have a few freshly formatted, blank disks ready whenever you log onto the system. I usually keep one for saving E-Mail messages and items of interest from the message boards. One or two more blank disks are then kept for downloading programs from the libraries whenever I see something of interest.

After I download a program, I usually copy it to another blank disk before trying it. This step is just a precaution, just in case the program does something funny to the disk—like trying to delete files or format the disk. You never know what might happen when you try something new. Later, after a program has been tried and tested, I copy it to a working disk with other similar programs for general use.

Don't forget that you can now download files directly via their filename if you know what and where they are. Directories and updates have been available from Q-Link now for some time, and can be of great help in locating files of interest. Just remember that the directories do not include the special interest areas that also have download libraries. You'll have to search through the other libraries to find what you want.

As I mentioned in my last column, the New Product Information section in CIN has a download library with a wide assortment of files and programs available. Anyone can upload text files or programs for this area as well. If you come across a demo program or any information appropriate for this area, please upload a copy and share it with us. Just be sure to let me know via E-Mail that you've uploaded a file to this area so it can be processed.

As usual, your questions, comments and suggestions are always welcome. I'm always looking for system hints you'd like to share, a particular area or feature of Q-Link you'd like to know more about, and ideas for future columns. ■

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month-to-date, quarter-to-date, and year-to-date sales; year-to-date freight charges; and the lowest percentage and/or amount of a bill that the customer is allowed to pay. Also included is the type of account (balance forward or open invoice), whether sales tax must be applied, terms of payment (definable by the user), and the General Ledger account number.

By clicking the mouse in the upper corner of the screen, the program displays an alternate transaction screen listing dates, descriptions, and amounts for up to 240 lines of customer transactions.

Every module, from ledger to services, prompts the user for this degree of detail. It is up to you how much detail you supply, though you cannot leave a screen without supplying the minimum required data items. It is clear that this program has been designed and programmed by individuals who are well versed in the procedures and the requirements of business management.

Report design and printing are handled ingeniously. Standard report forms such as Sales Report and Price List are pre-formatted and available in the system. Other reports, such as balance sheets (up to 15), can be custom designed and saved on the data disk.

Two different procedures are used, one for General Ledger reports, another for Inventory and Services reports. Report creation from the General Ledger offers a number of entry lines into which you can type the accounts or items that you want displayed. The open framework construction of the General Ledger Report Writer screen provides the creative flexibility that is desirable when devising financial reports.

Somewhat more structured is the Report Writer used with the Inventory and Services data bases. Here, you're presented with a listing of the database fields and the space to print up to 10 in a report (to a total of 80 report lines) along with the ability to limit and sort fields (inventory items of 10 or more, for instance, printed in ascending or descending numerical order).

At first, the documentation and the procedure for report creation is confusing, so specific and so unusual is the design process. After a few experiments, though, the process grows familiar and it becomes apparent that the structure was devised to help avoid ill-formatted, sloppy output. Even so, it would have been desirable to preview reports on the screen. The only way to see a report is to print it.

If you want several employees to have limited access to the system, a security password option allows the definition of up to ten passwords, each with its own level of security. A salesman, for example, might be allowed access to the sales invoice module but not to the General Ledger.

What doubts I have about the software are relatively minor ones. Though the software includes a point of sale invoice section, the lack of a cash register module limits the program's usefulness as a point of sale system.

There is no employee payroll module. However, B.E.S.T. plans to integrate that feature into the program this year. An upgrade path will be available to all registered owners.

The user is locked into using pre-printed forms. The printing routine does not allow you to generate a self-contained invoice. Forms that can be used with the system are available from B.E.S.T. as well. With a C.Itoh printer, I was limited to printing in ten characters per inch. The forms apparently are designed to format columns correctly only with that font pitch. With some printers, that could limit the appearance quality of your statements and reports (B.E.S.T. recommends the Panasonic 1091).

Although the program centers on the day to day operations of running a business, the documentation concentrates on the system modules. This can create confusion when the beginning accountant is scouring the manual in search of a real life solution. Considering the emphasis on accessibility in the software design, it would have been appropriate to enlarge the section of the manual that describes daily business procedures.

It is difficult to convey in print the sense of exhilaration that comes from using the B.E.S.T. system. There's a genuine freedom in racing from the depths of the stockroom up to the billing department and on to the bottom line of a balance statement—from Inventory to Invoicing to General Ledger in the flash of a mouse click.

With its combination of logical system design, versatile simplicity, and accounting power, the *B.E.S.T. Business Management System* is a likely option for the small to medium-sized business that has avoided computerizing its bookkeeping process due to difficulty or cost. This program turns the Amiga into an affordable accounting powerhouse. ■

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To keep each session varied and fresh, a number of user options have been incorporated into the contest. Up to four players can participate in the market, with the group deciding upon which year they would like their investment adventure to begin. Generous purses of cash are offered to help get you started, with allotments of 25, 50, and 100 thousand dollars to choose from. A standard game consists of five years, but can actually continue right through 1984 if so desired. This contest really has no winning score, but novices are sure to be satisfied if they successfully skirt bankruptcy, while seasoned speculators might want to see what type of profit they can build from the smallest initial base.

The one problem I anticipated finding with this program was neatly sidestepped by the Insight designers. When dealing with a contest steeped so deeply in historical events, I thought it would be fairly easy to gauge exactly how a particular security would behave after a few repeated visits into the same time period. But such is not the case. Although the relative sensitivity of the securities to each year's events remains accurate and consistent, the contest's designers have taken the liberty of incorporating a slight randomizing factor in the sequential lineup of past events. So, occasionally, the actual order in which important historical incidents occurred will be shuffled. It's no big deal as far as the fate of mankind is concerned, but with the securities' performances so contingent on the climate of their surroundings, this periodic scrambling of circumstances can mean all the difference in the world to an investor. In this way, the engaging challenge will never fade from familiarity.

Informative, involving and authentic on every level, the *Financial Time Machine* comes recommended as a highly entertaining present from our fascinating past.

## Encountering Historical Figures With Many Happy Returns

The stock market will often appear to take on a life of its own, intentionally making that sudden and unexpected turn just to frustrate your best laid strategies. It will soon become evident, even to the newcomers, that the only reliable rule of investing is that there are no reliable rules. But I've come across a couple of guidelines that seem to work for me with a fair bit of consistency. They won't make you an overnight millionaire, but they will help you to better acquaint yourself with the *Financial Time Machine*'s market surroundings.

For the smart investor, a stock on the decline is not always an untouchable item. As a matter of fact, when you happen to notice a steadily dropping issue, it's often a good idea to keep a watchful eye on it until it regains some balance and levels itself off. At that point, the stock has probably bottomed out, and the time is usually ripe for an investment gamble. Its purchase price is bound to be relatively cheap, and even if the issue takes its time making forward progress, the end result is still profits in your pocket.

The bar graphs displayed on pages 12 and 13 of the user's manual can be invaluable to the market forecaster. They chart each company's sensitivity to interest rates, political events and the GNP. Aside from providing a solid series of profiles to help one calculate investment opportunities, these graphs can also be used to pair off issues of similar structure; issues that will probably react in the same fashion to the stimuli of each specific market climate. When one of these matching stocks starts to fluctuate up or down, it's a sure bet that its look-alike cousin won't be far behind. Adjust your investment portfolio accordingly.

To help you to get your bearings during the first few rounds in the *Financial Time Machine* market, take the full hundred thousand dollars offered at the top of the contest and slip back into the early 1930's. That's the time period where your spending dollar will be worth the most. Watch the market for a few weeks to pick up on some trends, and when you do purchase, only take on four or five securities at a time. That might not seem like an overwhelming responsibility, but believe me, until you've become familiar with the workings of the exchange, this small handful of investments will keep you busy enough.

Don't be afraid to trade. A common mistake of market newcomers is to become married to their investments. The easiest way to lose your money is to hold onto a dropping issue—a security that once performed well—in the hope that it will soon revitalize itself and start to climb. Forget it and bail out! Insight reminds us to heed the wise old Wall Street saying that advises investors to "cut your losses and let your profits run." ■



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member of. The date on this book is 1985 so most of the information will be out of date.

Books are a great source of information and knowledge, but the best place to learn telecommunications is still from a friend. We have found nothing to replace a one-on-one personal instructor who can actually be there with you watching everything you do. Remember that your local users group is a place where you can get help and find that person or two who have the same interests as you and also that local expert to tutor you to learn telecommunications.

*The Computer Phone Book: Directory of Online Systems*
*The Computer Phone Book: Guide to Using Online Systems*
*The Computer Phone Book: Online Guide for the Commodore Computers*
New American Library
1633 Broadway
New York, NY 10019

*Compute's Personal Telecomputing*
Compute Publications, Inc.
P. O. Box 5406
Greensboro, NC 27403

*The Complete Handbook of Personal Computer Communications*
*How to Get Free Software*
*How to Look it Up Online*
St. Martin's Press
175 Fifth Avenue
New York, NY 10010

*Connections: Telecommunications on a Budget*
Scott, Foresman and Company
Professional Publishing Group
1900 East Lake Avenue
Glenview, IL 60025

*Understanding Data Communications*
Texas Instruments
P. O. Box 225012, MS-54
Dallas, TX 75265

*Answers Online: Your Guide to Information Data Bases*
Osborne McGraw-Hill
2600 Tenth Street
Berkeley, CA 94710 ■

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The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN,RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice. Note: Do not enter the commas.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

## SYNTAX ERROR

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270", type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parenthesis. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the 'wrong' line to look at. If the line the syntax error refers to has a function call (i.e., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

## ILLEGAL QUANTITY ERROR

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

## OUT OF DATA ERROR

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

## OTHER PROBLEMS

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than 80 (or 88) characters on one line. You can enter these lines by abbreviating the commands when you enter the line. The abbreviations for BASIC commands are on pages 133-134 of the VIC 20 user guide and 130-131 of the Commodore 64 user's guide.

If you type a line that is longer than 80 (or 88) characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed (without a line number). Many people write that the computer gives them a syntax error when they type the line, or that the computer refuses to accept a line. Both of these problems are results of typing a line of more than 80 (or 88) characters.

| | | |
|---|---|---|
| "[HOME]" = UNSHIFTED CLR/ HOME | "[PURPLE]" = CONTROL 5 | "[F1]" = F1 |
| "[CLEAR]" = SHIFTED CLR/HOME | "[GREEN]" = CONTROL 6 | "[F2]" = F2 |
| "[DOWN]" = CURSOR DOWN | "[BLUE]" = CONTROL 7 | "[F3]" = F3 |
| "[UP]" = CURSOR UP | "[YELLOW]" = CONTROL 8 | "[F4]" = F4 |
| "[RIGHT]" = CURSOR RIGHT | "[ORANGE]" = COMMODORE 1 | "[F5]" = F5 |
| "[LEFT]" = CURSOR LEFT | "[BROWN]" = COMMODORE 2 | "[F6]" = F6 |
| "[RVS]" = CONTROL 9 | "[L. RED]" = COMMODORE 3 | "[F7]" = F7 |
| "[RVOFF]" = CONTROL 0 | "[GRAY1]" = COMMODORE 4 | "[F8]" = F8 |
| "[BLACK]" = CONTROL 1 | "[GRAY2]" = COMMODORE 5 | "[POUND]" = ENGLISH POUND |
| "[WHITE]" = CONTROL 2 | "[L. GREEN]" = COMMODORE 6 | "[SHFT ^]" = PI SYMBOL |
| "[RED]" = CONTROL 3 | "[L. BLUE]" = COMMODORE 7 | "[^]" = UP ARROW |
| "[CYAN]" = CONTROL 4 | "[GRAY3]" = COMMODORE 8 | |

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

### THE PROGRAM WON'T RUN!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is 'running'. Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

### IF ALL ELSE FAILS

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program. The user group may also have the program on a library disk and be willing to make a copy for you.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase you understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

All of this information is helpful in answering your questions about why a program doesn't work. A letter that simply states "I get an error in line 250 whenever I run the program" doesn't give us much to go on. Send your questions to:

*Commodore Magazine*
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

Have fun with the programs!

## HOW TO USE THE MAGAZINE ENTRY PROGRAMS

The Magazine Entry Programs on the next pages are two BASIC machine language programs that will assist you in entering the programs in this magazine correctly. There are versions for both the Commodore 64 and the Commodore 128. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

### Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 49900 (4864-5545 on the 128) and just lets you know that the program is running. If everything is ok, the program will finish running and say DONE. Then type NEW. If there is a problem with the data statements, the program will tell you where to find the problem. Otherwise the program will say "mistake in data statements." Check to see if commas are missing, or if you have used periods instead of commas. Also check the individual data items.

Once the program has run, it is in memory ready to go. To activate the program type SYS49152 (SYS4864 on the 128), and press RETURN. You are now ready to enter the programs from the magazine. To disable the Entry Program, just type KILL (RETURN) on the 64 or SYS4867 on the 128.

The checksums for each line are the same for both the 64 and 128, so you can enter your 64 programs on the 128 if you'd like.

### Typing the Programs

All the BASIC program listings in this magazine that are for the 64 or 128 have an apostrophe followed by four letters at the end of the line (e.g., 'ACDF). If you plan to use the Magazine Entry Program to enter your programs, the apostrophe and letters **should** be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

### IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it **does not** enter that line into memory. This makes it impossible to enter a line incorrectly.

### Error Messages and What They Mean

There are five error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

**NO CHECKSUM:** This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

**QUOTE:** This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

**KEYWORD:** This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT. .) incorrectly. Check the line in the magazine again and check your spelling.

**# OF CHARACTERS:** This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

**UNIDENTIFIED:** This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake.

The Magazine Entry Programs are available on disk, along with other programs in this magazine, for $9.95. To order, contact Loadstar at 1-800-831-2694.

```
1Ø PRINT"[CLEAR]POKING -";
2Ø P=49152 :REM $CØØØ  (END AT
   4990Ø/$C2EC)
3Ø READ A$:IF A$="END"THEN 11Ø
4Ø L=ASC(MID$(A$,2,1))
5Ø H=ASC(MID$(A$,1,1))
6Ø L=L-48:IF L>9 THEN L=L-7
7Ø H=H-48:IF H>9 THEN H=H-7
8Ø PRINT"[HOME,RIGHT12]"P;
9Ø IF H>15 OR L>15 THEN PRINT
   :PRINT"DATA ERROR IN LINE";
   1ØØØ+INT((P-49152)/8):STOP
1ØØ B=H*16+L:POKE P,B:T=T+B:P=P+1
    :GOTO 3Ø
11Ø IF T<>862ØØ THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
12Ø PRINT"DONE":END
1ØØØ DATA 4C,1F,CØ,ØØ,ØØ,ØØ,ØØ,ØØ
1ØØ1 DATA ØØ,ØØ,ØØ,ØØ,ØØ,ØD,ØØ,21
1ØØ2 DATA C1,27,C1,2F,C1,3F,C1,4C
1ØØ3 DATA C1,EA,EA,EA,4C,54,CØ,A2
1ØØ4 DATA Ø5,BD,19,CØ,95,73,CA,1Ø
1ØØ5 DATA F8,6Ø,6Ø,AØ,Ø3,B9,ØØ,Ø2
1ØØ6 DATA D9,Ø4,C1,DØ,F5,88,1Ø,F5
1ØØ7 DATA AØ,Ø5,B9,A2,E3,99,73,ØØ
1ØØ8 DATA 88,1Ø,F7,A9,ØØ,8D,18,D4
1ØØ9 DATA 4C,EF,CØ,E6,7A,DØ,Ø2,E6
1Ø1Ø DATA 7B,4C,79,ØØ,A5,9D,FØ,F3
1Ø11 DATA A5,7A,C9,FF,DØ,ED,A5,7B
1Ø12 DATA C9,Ø1,DØ,E7,2Ø,2B,CØ,AD
1Ø13 DATA ØØ,Ø2,2Ø,74,CØ,9Ø,DC,AØ
1Ø14 DATA ØØ,4C,A9,C1,C9,3Ø,3Ø,Ø6
1Ø15 DATA C9,3A,1Ø,Ø2,38,6Ø,18,6Ø
1Ø16 DATA C8,B1,7A,C9,2Ø,DØ,Ø3,C8
1Ø17 DATA DØ,F7,B1,7A,6Ø,18,C8,B1
1Ø18 DATA 7A,FØ,37,C9,22,FØ,F5,6D
1Ø19 DATA Ø3,CØ,8D,Ø3,CØ,AD,Ø4,CØ
1Ø2Ø DATA 69,ØØ,8D,Ø4,CØ,4C,8E,CØ
1Ø21 DATA 18,6D,Ø5,CØ,8D,Ø5,CØ,9Ø
1Ø22 DATA Ø3,EE,Ø6,CØ,EE,Ø9,CØ,4C
1Ø23 DATA CE,C1,18,6D,Ø8,CØ,8D,Ø8
1Ø24 DATA CØ,9Ø,Ø3,EE,Ø7,CØ,EE,ØA
1Ø25 DATA CØ,6Ø,ØA,A8,B9,ØF,CØ,85
1Ø26 DATA FB,B9,1Ø,CØ,85,FC,AØ,ØØ
1Ø27 DATA A9,12,2Ø,D2,FF,B1,FB,FØ
1Ø28 DATA Ø6,2Ø,D2,FF,C8,DØ,F6,2Ø
1Ø29 DATA BC,C2,2Ø,E4,FF,FØ,FB,AØ
1Ø3Ø DATA 18,B9,Ø8,C1,2Ø,D2,FF,88
1Ø31 DATA 1Ø,F7,68,68,A9,ØØ,8D,ØØ
1Ø32 DATA Ø2,4C,74,A4,4B,49,4C,4C
1Ø33 DATA 91,91,ØD,2Ø,2Ø,2Ø,2Ø,2Ø
1Ø34 DATA 2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø
1Ø35 DATA 2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,91
1Ø36 DATA ØD,51,55,4F,54,45,ØØ,4B
1Ø37 DATA 45,59,57,4F,52,44,ØØ,23
1Ø38 DATA 2Ø,4F,46,2Ø,43,48,41,52
1Ø39 DATA 41,43,54,45,52,53,ØØ,55
1Ø4Ø DATA 4E,49,44,45,4E,54,49,46
1Ø41 DATA 49,45,44,ØØ,4E,4F,2Ø,43
1Ø42 DATA 48,45,43,4B,53,55,4D,ØØ
1Ø43 DATA C8,B1,7A,DØ,FB,84,FD,CØ
1Ø44 DATA Ø9,1Ø,Ø3,4C,84,C1,88,88
1Ø45 DATA 88,88,88,B1,7A,C9,27,DØ
1Ø46 DATA 13,A9,ØØ,91,7A,C8,A2,ØØ
1Ø47 DATA B1,7A,9D,3C,Ø3,C8,E8,EØ
1Ø48 DATA Ø4,DØ,F5,6Ø,A9,Ø4,4C,CA
1Ø49 DATA CØ,AØ,ØØ,B9,ØØ,Ø2,99,4Ø
1Ø5Ø DATA Ø3,FØ,FØ,C8,DØ,F5,AØ,ØØ
1Ø51 DATA B9,4Ø,Ø3,FØ,E6,99,ØØ,Ø2
1Ø52 DATA C8,DØ,F5,2Ø,96,C1,4C,12
1Ø53 DATA C2,AØ,Ø9,A9,ØØ,99,Ø3,CØ
1Ø54 DATA 8D,3C,Ø3,88,1Ø,F7,A9,8Ø
1Ø55 DATA 85,Ø2,AØ,ØØ,2Ø,58,C1,2Ø
1Ø56 DATA 89,C1,2Ø,ED,C1,E6,7A,E6
1Ø57 DATA 7B,2Ø,7C,A5,AØ,ØØ,2Ø,8Ø
1Ø58 DATA CØ,FØ,DØ,24,Ø2,FØ,Ø6,4C
1Ø59 DATA A8,CØ,4C,CE,C1,C9,22,DØ
1Ø6Ø DATA Ø6,2Ø,8D,CØ,4C,CE,C1,2Ø
1Ø61 DATA BA,CØ,4C,CE,C1,AØ,ØØ,B9
1Ø62 DATA ØØ,Ø2,2Ø,74,CØ,C8,9Ø,ØA
1Ø63 DATA 18,6D,Ø7,CØ,8D,Ø7,CØ,4C
1Ø64 DATA EF,C1,88,A2,ØØ,B9,ØØ,Ø2
1Ø65 DATA 9D,ØØ,Ø2,FØ,Ø4,E8,C8,DØ
1Ø66 DATA F4,6Ø,18,AD,Ø9,CØ,69,41
1Ø67 DATA 8D,Ø9,CØ,38,AD,ØA,CØ,E9
1Ø68 DATA 19,9Ø,Ø6,8D,ØA,CØ,4C,1C
1Ø69 DATA C2,AD,ØA,CØ,69,41,8D,ØA
1Ø7Ø DATA CØ,AD,Ø3,CØ,6D,Ø5,CØ,48
1Ø71 DATA AD,Ø4,CØ,6D,Ø6,CØ,8D,ØC
1Ø72 DATA CØ,68,6D,Ø8,CØ,8D,ØB,CØ
1Ø73 DATA AD,ØC,CØ,6D,Ø7,CØ,8D,ØC
1Ø74 DATA CØ,38,E9,19,9Ø,Ø6,8D,ØC
1Ø75 DATA CØ,4C,52,C2,AD,ØC,CØ,69
1Ø76 DATA 41,8D,ØC,CØ,AD,ØB,CØ,E9
1Ø77 DATA 19,9Ø,Ø6,8D,ØB,CØ,4C,67
1Ø78 DATA C2,AD,ØB,CØ,69,41,8D,ØB
1Ø79 DATA CØ,AØ,Ø1,AD,Ø9,CØ,CD,3C
1Ø8Ø DATA Ø3,DØ,2Ø,C8,AD,ØA,CØ,CD
1Ø81 DATA 3D,Ø3,DØ,17,C8,AD,ØB,CØ
1Ø82 DATA CD,3E,Ø3,DØ,ØE,AD,ØC,CØ
1Ø83 DATA CD,3F,Ø3,DØ,Ø6,2Ø,CC,C2
1Ø84 DATA 4C,4B,CØ,98,48,68,4C,CA
1Ø85 DATA CØ,A9,2Ø,8D,ØØ,D4,8D,Ø1
1Ø86 DATA D4,A9,Ø9,8D,Ø5,D4,A9,ØF
1Ø87 DATA 8D,18,D4,6Ø,2Ø,A9,C2,A9
1Ø88 DATA 81,2Ø,DF,C2,A9,8Ø,2Ø,DF
1Ø89 DATA C2,4C,D9,C2,2Ø,A9,C2,A9
1Ø9Ø DATA 11,2Ø,DF,C2,A9,1Ø,2Ø,DF
1Ø91 DATA C2,A9,ØØ,8D,Ø4,D4,6Ø,8D
1Ø92 DATA Ø4,D4,A2,7Ø,AØ,ØØ,88,DØ
1Ø93 DATA FD,CA,DØ,FA,6Ø,END
```

END

```
5 TRAP 200
10 PRINT"[CLEAR]POKING -";
20 P=4864 :REM $1300  (END AT
   5545/$15A9)
30 READ A$:IF A$="END"THEN 110
80 PRINT"[HOME,RIGHT12]"P;
100 B=DEC(A$):POKE P,B:T=T+B:P=P+1
   :GOTO 30
110 IF T<>59311 THEN PRINT
   :PRINT"MISTAKE IN DATA --> CHECK
   DATA STATEMENTS":END
120 PRINT"DONE":END
200 PRINT:PRINT"DATA ERROR IN LINE";
   1000+INT((P-4864)/8):END
1000 DATA 4C,1E,13,4C,3A,13,00,00
1001 DATA 8E,00,F7,00,42,41,51,57
1002 DATA 0D,00,0D,43,08,14,0E,14
1003 DATA 16,14,26,14,33,14,A9,00
1004 DATA 8D,00,FF,AD,04,03,8D,12
1005 DATA 13,AD,05,03,8D,13,13,A2
1006 DATA 4A,A0,13,8E,04,03,8C,05
1007 DATA 03,60,AD,12,13,8D,04,03
1008 DATA AD,13,13,8D,05,03,60,6C
1009 DATA 12,13,A5,7F,D0,F9,AD,00
1010 DATA 02,20,5B,13,90,F1,A0,00
1011 DATA 4C,6F,14,C9,30,30,06,C9
1012 DATA 3A,10,02,38,60,18,60,C8
1013 DATA B1,3D,C9,20,D0,03,C8,D0
1014 DATA F7,B1,3D,60,18,C8,B1,3D
1015 DATA F0,35,C9,22,F0,F5,6D,06
1016 DATA 13,8D,06,13,AD,07,13,69
1017 DATA 00,8D,07,13,4C,75,13,18
1018 DATA 6D,08,13,8D,08,13,90,03
1019 DATA EE,09,13,EE,0C,13,60,18
1020 DATA 6D,0B,13,8D,0B,13,90,03
1021 DATA EE,0A,13,EE,0D,13,60,0A
1022 DATA A8,B9,14,13,85,FB,B9,15
1023 DATA 13,85,FC,A0,00,8C,00,FF
1024 DATA A9,12,20,D2,FF,B1,FB,F0
1025 DATA 06,20,D2,FF,C8,D0,F6,20
1026 DATA 79,15,20,A3,15,20,E4,FF
1027 DATA F0,FB,A0,1B,B9,EF,13,20
1028 DATA D2,FF,88,10,F7,68,68,A9
1029 DATA 00,8D,00,02,4C,B7,4D,91
1030 DATA 91,0D,20,20,20,20,20,20
1031 DATA 20,20,20,20,20,20,20,20
1032 DATA 20,20,20,20,20,20,91,0D
1033 DATA 51,55,4F,54,45,00,4B,45
1034 DATA 59,57,4F,52,44,00,23,20
1035 DATA 4F,46,20,43,48,41,52,41
1036 DATA 43,54,45,52,53,00,55,4E
1037 DATA 49,44,45,4E,54,49,46,49
1038 DATA 45,44,00,4E,4F,20,43,48
1039 DATA 45,43,4B,53,55,4D,00,C8
1040 DATA B1,3D,D0,FB,C0,06,10,03
1041 DATA 4C,69,14,88,88,88,88,88
1042 DATA B1,3D,C9,27,D0,13,A9,00
1043 DATA 91,3D,C8,A2,00,B1,3D,9D
1044 DATA 00,0B,C8,E8,E0,04,D0,F5
1045 DATA 60,4C,5C,15,4C,C5,14,A0
1046 DATA 09,A9,00,99,06,13,8D,00
1047 DATA 0B,88,10,F7,A9,80,85,FD
1048 DATA A0,00,20,3F,14,20,AE,14
1049 DATA 20,0D,43,84,FA,A0,FF,20
1050 DATA 67,13,F0,D8,24,FD,F0,06
1051 DATA 20,8F,13,4C,8F,14,C9,22
1052 DATA D0,06,20,74,13,4C,8F,14
1053 DATA 20,9F,13,4C,8F,14,A0,00
1054 DATA B9,00,02,20,5B,13,C8,90
1055 DATA 0A,18,6D,0A,13,8D,0A,13
1056 DATA 4C,B0,14,88,60,18,AD,0C
1057 DATA 13,69,41,8D,0C,13,38,AD
1058 DATA 0D,13,E9,19,90,06,8D,0D
1059 DATA 13,4C,CF,14,AD,0D,13,69
1060 DATA 41,8D,0D,13,AD,06,13,6D
1061 DATA 08,13,48,AD,07,13,6D,09
1062 DATA 13,8D,0F,13,68,6D,0B,13
1063 DATA 8D,0E,13,AD,0F,13,6D,0A
1064 DATA 13,8D,0F,13,38,E9,19,90
1065 DATA 06,8D,0F,13,4C,05,15,AD
1066 DATA 0F,13,69,41,8D,0F,13,AD
1067 DATA 0E,13,E9,19,90,06,8D,0E
1068 DATA 13,4C,1A,15,AD,0E,13,69
1069 DATA 41,8D,0E,13,A0,01,AD,0C
1070 DATA 13,CD,00,0B,D0,20,C8,AD
1071 DATA 0D,13,CD,01,0B,D0,17,C8
1072 DATA AD,0E,13,CD,02,0B,D0,0E
1073 DATA AD,0F,13,CD,03,0B,D0,06
1074 DATA 20,89,15,A4,FA,60,98,48
1075 DATA 68,4C,AF,13,A9,04,4C,AF
1076 DATA 13,A9,00,8D,00,FF,A9,20
1077 DATA 8D,00,D4,8D,01,D4,A9,09
1078 DATA 8D,05,D4,A9,0F,8D,18,D4
1079 DATA 60,20,61,15,A9,81,20,9C
1080 DATA 15,A9,80,20,9C,15,4C,96
1081 DATA 15,20,61,15,A9,11,20,9C
1082 DATA 15,A9,10,20,9C,15,A9,00
1083 DATA 8D,04,D4,60,8D,04,D4,A2
1084 DATA 70,A0,00,88,D0,FD,CA,D0
1085 DATA FA,60,END
```

END

*Although there are almost 1000 known Commodore user groups nationwide and around the world, this list includes only those that have been officially recognized by Commodore as Approved User Groups. If your group would like to apply for Approved status, contact Pete Baczor, User Group Coordinator, at Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.*

*Commodore user groups provide invaluable assistance to Commodore computerists. If you are looking for people who share your computing interests, or if you need help getting started with your computer, contact the group near you.*

### ALABAMA

Bay Minette
B-128 Commodore Users' Group (South)
P.O. Box 164, AL 36507
**PET VIC 64**

Birmingham
Birmingham Commodore Club
P.O. Box 59564, AL 35222

Birmingham
Commodore Club - South
P.O. Box 324, AL 35126
**64 128 Amiga**

Decatur Valley Commodore Users' Group
P.O. Box 835, AL 35602
**VIC 64 128 Amiga**

Evergreen
The Byte Bunch
318 Perryman St., AL 36401
**PET VIC 64 128 Amiga PC**

Florence
Shoals Commodore Users' Group
114 Van Fleet Dr., AL 35630

Gadsden
Coosa Valley Commodore Club
2800 Waters Ave., AL 35904
**64 128 Amiga**

Huntsville
Computeen Computer Club
10118 Shades Rd., AL 35803

Mobile
Commodore Club of Mobile
3868-H Rue Maison Road
AL 36608

Montgomery
M.A.C.K.S.
P.O. Box 210126, AL 36121-0126
**PET VIC 64 128 Amiga PC**

Scottsboro
Scottsboro Commodore Users' Group
Route #5, Box 255, AL 35768
**64 128 Amiga PC**

Smith's
Smith's Alabama Commodore Users' Group
Route 2, Box 105, AL 36877
**VIC 64 128 Amiga**

Tuscaloosa
Tuscaloosa Users' Society Kommodore
P.O. Box 439, AL 35402
**PET VIC 64 128 Amiga PC**

### ALASKA

Anchorage
Anchorage Commodore Users' Group
P.O. Box 104615, AK 99510
**VIC 64 128 Amiga**

Amiga Users' Group of Alaska
12936 Jeanne Rd., AK 99516
**Amiga**

Juneau
Juneau Commodre Users' Group
9357 Northland, AK 99801
**64 128 Amiga PC**

Sitka
Sitkas Commodore Users' Group
P.O. Box 2204, AK 99835

### ARIZONA

Chino Valley
Prescott Area Commodore Club
1631 N. Canfield Ave., AZ 86323

Globe
Gila Hackers
Route #1, Box 34, AZ 85501
**64 128**

Sierra Vista
Thunder Mountain Commodore Computer Users' Group
P.O. Box 1796, AZ 85636
**VIC 64 128 Amiga PC**

Tempe
Arizona Commodore Users' Group
P.O. Box 27201, AZ 85282

Tucson
Catalina Commodore Computer Club
2634 E. Malvern St., AZ 85716
**VIC 64 128 Amiga PC**

### ARKANSAS

Fort Smith
Commodore Computer Club of Ft. Smith
P.O. Box 6000, South Station,
AR 72906

North Little Rock
River City Commodore Computer Club
P.O. Box 4298, AR 72116
**64 128 Amiga PC**

Pine Bluff
Commodore Computer Club of Pine Bluff
P.O. Box 1083, AR 71613
**64 128 Amiga**

### CALIFORNIA

Alta Loma
CACTUS
P.O. Box 1277, CA 91701
**PET VIC 64 128**

Anaheim
20/64 Group
2170 W. Broadway, Suite 529,
CA 92804-2446

Antioch
The Commoodre Connection Users' Group
3210 Tabora Dr., CA 94509
**VIC 64 128**

Arcadia
Pasadena Commodore Computer Club
P.O. Box 1163, CA 91006
**PET VIC 64 128 Amiga PC**

Auburn
Auburn Commodore Computer Club
P.O. Box 4270, CA 95604
**PET VIC 64 128 Amiga PC**

Bakersfield
ABACUS
P.O. Box 3415, CA 93385
**PET VIC 64 128 Amiga PC**

Concord
Diablo Valley Commodore Users' Group
P.O. Box 27155, CA 94598
**64 128 Amiga**

Denair
Valley Computer Club
P.O. Box 310, CA 95316
**PET VIC 64 128**

Hollywood
Hollywood Users' Group
P.O. Box 38313, CA 90038
**64 128 Amiga PC**

Huntington Beach
West Orange County Commodore Users' Group
20311 Ravenwood Lane, CA 92647
**64 128**

Laguna Hills
South Orange Commodore Klub
25401 Champlain Rd., CA 92653

Long Beach
Commodore Helpers
3736 Myrtle Ave., CA 90807

Los Angeles
Los Angeles Amiga Users' Group
1711 Altivo Way, CA 90026

Monterey
Plus/4 Users' Group
P.O. Box 1001, CA 93942

Napa
Napa Valley Commodore Computer Club
P.O. Box 2324, CA 94558
**VIC 64 128**

Oceanside
Oceana-64
1004 Plover Way, CA 92056
**64 128**

Paso Robles
Simply Users' of Computers
301 Veronica Dr., CA 93446
**PET VIC 64 128 Amiga PC**

Point Magu
Point Magu Users' Association
P.O. Box 42360, CA 93042-0360

Redding
C.O.U.G.A.R.
2776 Helen St., Apt. A, CA 96002
**PET VIC 64 128 Amiga PC**

Riverside
Moreno Valley Commodore Users' Group
P.O. Box 5494, CA 92517
**PET VIC 64 128 Amiga**

Rosemead
Rosemead Associate Members
2636 N. Willard Ave., CA 91770
**64 128**

Sacramento
Sacramento Commodore Users' Group
P.O. Box 13393, CA 95813-13393

Santa Barbara
Santa Barbara Commodore Users' Group
4520 Via Vistosa, CA 93110

San Bernardino
Club 64
P.O. Box 514, Patton, CA 92369-0514
**VIC 64 128 Amiga**

San Diego
San Diego Commodore Users' Group
P.O. Box 86531, CA 92138-6531

San Jose
64/More Commodore Users' Group
P.O. Box 26811, CA 95159-6811
**VIC 64 128 Amiga PC**

San Luis Obispo
San Luis Obispo Commodore Club
P.O. Box 3836, CA 93403-3836

San Rafael
Marin Commodore Computer Club
665 Las Colindas Rd., CA 94903
**VIC 64 128 Amiga**

Santa Maria
Central Coast Commodore Users' Group
4237 Plumeria Ct., CA 93455
**VIC 64 128**

Santa Rosa
Santa Rosa Commodore Users' Group
333 E. Robles Ave., CA 95407-7971
**64 128 Amiga**

Stockton
Stockton Commodore Users' Group
1911 Comstock Dr., CA 95209
**VIC 64 128**

Studio City
Southern California 64 Users' Group
3852 Riverton, CA 91604

Thousand Oaks
Simi Valley Commodore Users' Group
1586 Glenbrock Ln., CA 91320-1805
**64 128 Amiga**

Ventura
Ventura Commodore Club
6464 Shearwater St., CA 93003
**VIC 64 128 Amiga**

Westminster
South County Amiga Users' Group
13712 Claremount St., CA 92683
**Amiga**

### COLORADO

Aurora
Colorado PET Users' Group
676 S. Quentin St., CO 80012

Colorado Springs
Commodore Club 4058 Baytown Dr.,
CO 80916
**PET VIC 64 128 Amiga PC**

Ft. Collins
Ft. Collins C3
1660 Shenandoah Cir., CO 80525

Grand Junction
Western Slope Commodore Users' Group
P.O. Box 4142, CO 81502-4142
**64 128**

Greeley
NorCoCom
2138 1/2 - 10th St. Rd., CO 80631

Lakewood
Commodore Condor Club
1680 Lewis St., CO 80215

North Glenn
Colorado Commodore Computer Club
11855 Adams St., CO 80233
**PET VIC 64 128 Amiga PC**

### CONNECTICUT

Bristol
Bristol Commodore Users' Group
CompuTech Systems, 178 Pine St.,
CT 06010
**64 128**

Danbury
Fairfield County Commodore Users' Group
P.O. Box 212, CT 06813
**VIC 64 128 Amiga**

East Hartford
Hartford County Commodore Users' Group
P.O. Box 8553, CT 06108
**VIC 64 128 Amiga**

Hebron
Eastern Connecticut Commodore Users' Group
227 Jagger Lane, CT 06248

Meriden
Silver City Commodore Club
70 Webster St., 1st Floor, CT 06450
**VIC 64 128**

North Haven
Greater New Haven Commodore Users' Group
P.O. Box 796, CT 06473
**VIC 64 128 Amiga**

Stamford
Stamford Area Commodore Society
P.O. Box 1337, CT 06904

Vernon
Capitol Area Commodore Club
P.O. Box 2372, CT 06066

Waterford
Millstown Users' Group - 64
Sillin Nuclear Training Center,
P.O. Box 128, CT 06385-0128
**64 128 Amiga**

### DELAWARE

Lewes
Lower Delaware Commodore Computer Club
R.D. #2, Box 52-A, DE 19958

### DISTRICT of COLUMBIA

Washington
USO Computer Club
207 Beyer Rd., S.W., DC 20032
**64 128 Amiga PC**

### FLORIDA

Beverly Hills
Citrus County Commodore Club
P.O. Box 503, FL 32665
**PET VIC 64 128 Amiga PC**

Bradenton
Manasota Commodore Users' Group
916 E. 35th Ave. Dr., FL 33508

Dade City
East Pasco Commodore Users' Group
P.O. Box 798, FL 34297-0798
**VIC 64 128 Amiga**

Daytona Beach
Daytona Beach Amiga Computer Enthusiasts
P.O. Box 10204, Westside Station,
FL 32020
**Amiga**

Deerfield Beach
Gold Coast Commodore Group
P.O. Box 375, FL 33441
**64 128**

Englewood
RAM ROM 64
P.O. Box 1369, FL 33533

Ft. Lauderdale
Telecomm Pro Group of Southern Florida
1140 Atkinson Ave., FL 33312

Ft. Walton Beach
Okaloosa Commodore Users' Group
412-A Cobia Avenue, FL 32548

Gainesville
Gainesville Commodore Users' Group
P.O. Box 14716, FL 32604
**PET VIC 64 128 Amiga PC**

Jacksonville
Commodore Computer Club
8438 Lynda Sue Ln. W., FL 32217
**VIC 64 128**

Lakeland
Lakeland Police Users' Group
2332 Crystal Park North, FL 33803

Melbourne
El-Shift-Oh
P.O. Box 361348, FL 32936-1348

Merritt Island
Space Coast AMIGA Users' Group
P.O. Box 2098, FL 32952
**Amiga**

Miami
Miami 2064
11531 SW 84th St., FL 33173-3622

Miami
M.I.C.E.
11110 Bird Rd., FL 33165
**VIC 64 128**

Miami Springs
Miami Springs Hialeah Users' Group
517 Wren Avenue, FL 33166
**PET VIC 64 128**

Ocala
Tri-County Commodore Users' Group
P.O. Box 1151, FL 32678

Orlando
Central Florida Commodore Users' Group
P.O. Box 7326, FL 32854

Oviedo
Central Florida Amiga Club
1056 Neely Street, FL 32765
**Amiga**

Ozona
Suncoast 64s
P.O. Box 6628, FL 34265-6628

Pensacola
Commodore Users of Pensacola
P.O. Box 3533, FL 32516
**VIC 64 128**

Port Charlotte
Charlotte County Commodore Club
567 N. Ellicott Cir., FL 33952

Ruskin
C.U.S.H.
107 N. Branch Rd., W., FL 33570

Sanibeo
Sanibel Commodore VIC
P.O. Box 1227, FL 33957

Shalimar
Ft. Walton Beach Commodore Users' Group
P.O. Box 3, FL 32549
**VIC 64 128 Amiga PC**

Titusville
Titusville Commodore Club, Inc
890 Alford St., FL 32796
**VIC 64 128 Amiga**

### GEORGIA

Albany
Albany Commodore Amateur Computer
P.O. Box 5461, GA 31706-5461

Athens
Athens Commodore Enthusiasts (ACE)
130 St. James Drive, GA 30606

Atlanta
Amiga Atlanta
Box 7724, GA 30357
**Amiga**

Augusta
Commodore Club of Augusta
P.O. Box 14337, GA 30919
**VIC 64 128 Amiga**

Calhoun
R.C. Creations Users' Group
177 Flora Dr., S.W., GA 30701
**VIC 64 128**

Decatur
Commodore Users' Group of Atlanta
633 Clairmont Cir., GA 30033

Forest Park
Clayton County C-64 Users' Group
6379 Bimini Drive, GA 30050
**PET VIC 64 128**

Lilburn
Stone Mountain Users' Group
P.O. box 1762, GA 30247
**VIC 64 128 Amiga**

Savannah
SCUG C/O
103 Virginia Avenue, GA 31404

### HAWAII

Ewa Beach
Byte-After-Byte
NAS Barbers Point, 2041C Roosevelt Avenue, HI 96707

Honolulu
Advanced Users' Group
1001-B Signer Blvd., HI 96818
**64 128 Amiga**

Honolulu
20/64 Hawaii
P.O. Box 23260, HI 97822

### IDAHO

Blackfoot
Blackfoot Users' Group
760 Janet Street, ID 83221

Idaho Falls
Eagle Rock Commodore Computer Club
P.O. Box 3884, ID 83401-3884
**64 128 Amiga**

Jerome
PFP 64 Software Exchange
742 E. 19th, ID 83338
**64**

Lewiston
Banana Belt Commodore Users' Group
P.O. Box 1272, ID 83501
**VIC 64 128 Amiga PC**

Paul
Mini-Cassia Computer Club
Route 1, Box 1494, ID 83347
**VIC 64 128**

Pingree
The Blackfoot Users' Group
417 South 1200 West, ID 83262

### ILLINOIS

Alton
East Side Computer Club
P.O. Box 1347, IL 62002-1347
**VIC 64 128 Amiga**

Ashkum
Ashkum Hackers Commodore Users' Group
Box 288, IL 60911
**64 128 Amiga**

Bloomington
Bloomington Normal Commodore Users' Group, Inc.
P.O. Box 1058, IL 61702-1058
**VIC 64 128 Amiga PC**

Canton
Canton Area Commodore Users' Group
13 N. 17th Ave., IL 61520

Darien
Suburban Commodore Users' Group
P.O. Box 2201, IL 60559
**64 128 Amiga**

East Peria
PAPUG
6 Appletree Lane, IL 61611

Elgin
Fox Valley Commodore Users' Group
833 Prospect, IL 60120
**PET VIC 64 128 Amiga**

Galesburg
Knox Commodore Club
195 Olive St., IL 61401

Lacon
Heart of Illinois Commodore Users' Group
904 Fifth St., IL 61540

Metropolis
Massac County Commodore Users' Group
15 Hickory Lane, Route 3, IL 62960
**VIC 64 128 Amiga**

Monmouth
Western Illinois Commodore Users' Group
906 West 6th Ave., IL 61462
**PET VIC 64 128 Amiga PC**

Murrayville
Jacksonville Area Commodore Users' Group
P.O. Box 135, IL 62668
**64 128**

North Aurora
Fox Valley 64 Users' Group
P.O. Box 28, IL 60542
**64 128**

Springfield
Capitol City Commodore Computer Club
P.O. Box 2961, IL 62708

Springfield
SPUG Computer Club
3116 Concord, IL 62704
**64 128 Amiga PC**

Tuscola
Champaign-Urbana Commodore Users' Group
802 N. Parke St., IL 61953
**PET VIC 64 128 Amiga**

### INDIANA

Anderson
Anderson Commodore Users' Group
P.O. Box 940, IN 46015

Bloomington
Bloomington Commodore Users' Group
800 E. Atwater, IN 47405

Evansville
Commodore Computer Club
P.O. Box 2332, IN 47714
**VIC 64 128 Amiga PC**

Fort Wayne
Fort Wayne Area Commodore Club
P.O. Box 13107, IN 46867
**VIC 64 128 Amiga PC**

Greenfield
C.H.U.G.
1322 Fairview Drive, IN 46140

Indianapolis
Indy Commodore Computer Club
P.O. Box 11543, IN 46201
**VIC 64 128 Amiga PC**

Kokomo
Kokomo Commodore Computer Club
6016 Yale Court, IN 46902

LaPorte
Commodore Users' Group of Greater La Porte County
P.O. Box 1633, IN 46350
**VIC 64 128 Amiga**

Lafayette
Commodore Owners of Lafayette
P.O. Box 5763, IN 47903
**64 128**

Logansport
Logansport Commodore Club
2329 Myers Lane, IN 46947
**64 128 Amiga**

Pleasant Lake
Steuben's Commodore Users' Group
P.O. Box 25, IN 46779-0025
**VIC 64 128 Amiga**

Terre Haute
Western Indiana Commodore Users
P.O. Box 1898, IN 47808

### IOWA

Ames
COUGAR Commodore Users' Group
P.O. Box 2302, IA 50012
**VIC 64 128**

Cedar Rapids
Commo-Hawk Commodore Users' Group
P.O. Box 2724, IA 52406-2724
**PET VIC 64 128 Amiga PC**

Davenport
Quad-City Commodore Computer Club
P.O. Box 3994, IA 52808

Denison
Crawford County Commodore Users' Group
519 N. 19th Street, IA 51442

Hartford
Capitol Complex Commodore Computer Club
P.O. Box 58, IA 50118
**64 128 Amiga**

LeMars
Plymouth County Commodore Users' Group
300 Third Ave. SE, IA 51031

Spencer
Syntax Errors Anonymous
1224 - 14th Avenue West,
IA 51301-2941
**PET VIC 64 128 Amiga PC**

Washington
Washington Area Commodore Users' Group
P.O. Box 445, IA 52353
**64 128 Amiga**

Waterloo
P.E.C.C.U.G.
333 Joy Drive, IA 50701
**VIC 64 128 Amiga PC**

### KANSAS

Ft. Leavenworth Commodores Galore
221 Hancock, KS 66027
**PET VIC 64 128 Amiga**

Hays
High Plains Commodore Users' Group
1307 Western Plains Drive, KS 67601
**64 128 Amiga**

Hutchinson
Salt City Commodore Club
P.O. Box 2644, KS 67504-2644
**64 128 Amiga**

Lawrence
Lawrence Commodore Users' Group
P.O. Box 2204, KS 66045
**VIC 64 128**

Parsons
Parsons Commodore Users' Group
P.O. Box 822, KS 67357
**64 128 Amiga PC**

Wakarusa
Topeka Commodore Computer Users' Group
7939 S. Topeka Blvd., #39, KS 66546

Wichita
Commodore Users' Group of Wichita, Inc.
P.O. Box 593, KS 67201-0593
**PET VIC 64 128 Amiga PC**

### KENTUCKY

Glasgow
Glasgow Commodore Users' Group
P.O. Box 154, KY 42141

Lexington
Commodore Users' Group of Central Kentucky
P.O. Box 55010, KY 40555
**PET VIC 64 128 Amiga**

Louisville
LUCKY
P.O. Box 19032, KY 40219-0032

Madisonville
Commodore Users' Group of Madisonville
P.O. Box 849, KY 42431
**64 128 Amiga**

### LOUISIANA

Baton Rouge
Baton Rouge C-64 Users' Group
P.O. Box 1422, LA 70821

Gray
Southeast Louisiana Commodore Users' Group
P.O. Box 1138, LA 70359
**PET VIC 64 128 Amiga PC**

Lafayette
Acadiana Commodore Computer Club
P.O. Box 31412, LA 70503-1412

Lake Charles
Lake Charles Users' Group
5631 Lakelyn, LA 70605

Metairie
Sixty-Four 'Um
4317 Stockton Street, LA 70001

Metairie
New Orleans Commodore Klub
2308 Houma Blvd., Apt. 724, LA 70001
**64 128 Amiga PC**

Shreveport
Ark-La-Tex Commodore Computer Club
P.O. Box 6502, LA 71106
**64 128 Amiga**

Swartz
Northeast Louisiana Commodore Users' Group
P.O. Box 175, LA 71821

### MAINE

Houlton
Southern Arostook Commodore Users
P.O. Box 451, ME 04730

Orono
Commodore Users' Group of Penobscot
101 Crosby Hall, U of ME at Orono,
ME 04469
**PET VIC 64 128 Amiga PC**

Scarborough
Southern Maine Commodore Users' Group
P.O. Box 416, ME 04074-0416

Topsham
Your Commodore Users' Group
103 Main St., ME 04086
**VIC 64 128 Amiga PC**

### MARYLAND

Annapolis
Annapolis Commodore Users' Group
P.O. Box 3358, MD 21403

Baltimore
Another Baltimore Commodore Users' Group
3 Hopkins St., MD 21061

Baltimore
Randallstown Commodore Users' Group
3702 Durley Lane, MD 21207
**PET VIC 64 128 Amiga PC**

Ft. Meade
C-64/128 Computer Users' Group
SEALANDAIR Recreation Center
9810 Emory Rd., MD 20755
**64 128 Amiga**

Gaithersburg
Gaithersburg Commodore 64 Users' Group
8705 Waxwing Ter., MD 20879

Hagerstown
Hagerstown Users' Group
23 Coventry Lane, MD 21740
**VIC 64 128 Amiga PC**

Leonardtown
PAX/COM/64
240 Jefferson St., MD 20650

Lutherville
CUM-BACC
1427 York Rd. at Seminary Ave.,
MD 21093-6014
**64 128 Amiga**

Rockville
Rockville Commodore Users' Group
P.O. Box 8805, MD 20856
**VIC 64 128 Amiga**

Silver Springs
Vic Appreciators
10260 New Hampshire Ave., MD 20903
**VIC**

Townson
BAYCUG
12 Wilfred Court, MD 21204

### MASSACHUSETTS

Cotuit
Commodore Users' Group of Cape Code
P.O. Box 1490, MA 02635
**VIC 64 128 Amiga**

Fall River
M.E.M.O. Computer Club
P.O. Box 3336, MD 2722-3336
**VIC 64 128 Amiga**

Hathorne
World Wide Users' Group
P.O. Box 50 C/P, MA 01937

Marlboro
EM2064 Commodore Users' Group
6 Flagg Rd., MA 01752

Rockland
Rockland Commodore Users' Group
98 Myrtle St., MA 02370
**PET VIC 64 128 Amiga PC**

Westfield
Pioneer Valley Commodore Club
6 Laurel Ter., MA 01085

### MICHIGAN

Ann Arbor
Commodore Users' Group of the U of Michigan
School of Public Health, MI 48109
**PET VIC 64 128**

Bay City
Commodore Connection Club
400 - 18th St., MI 48708

Brooklyn
Columbia Commodore Computer Club
133 Ernest, MI 49230
**64 128 Amiga**

Clio
Northern Genesee Commodore Users' Group
P.O. Box 250, MI 48420

Coloma
Access Unlimited
6777 Bayview Dr., MI 49038
**VIC 64 128 Amiga**

Dollar Bay
Copper County Computer Users' Group
P.O. Box 196, MI 49922

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ACO
4401 Pinegrove Dr., MI 48428

East Lansing
Lansing Area Commodore Club
P.O. Box 1065, MI 48823

Gaylord
Northern Michigan Commodore Club
P.O. Box 3066, MI 49735
**PET VIC 64 128 Amiga**

Holland
Holland Area Commodore Users' Group
1576 Elmer, MI 49423
**PET VIC 64 128 Amiga PC**

Hudsonville
West Michaigan Commodore Users' Group
3317 Van Buren, MI 49426

Jackson
Jackson Commoodre Computer Club
2553 Dan Street, MI 49201
**PET VIC 64 128 Amiga PC**

Lennon
Commodore Users' Group of Durand
11715 Park Dr., MI 48449

Richmond
COMP
7514 Puttygut Rd., MI 48062
**VIC 64 128**

Southgate
Down River Commodore Users' Group
P.O. Box 1277, MI 48195
**VIC 64 128 Amiga**

Traverse City
Traverse Area Commodore Club
200 High Lake Rd., MI 49684
**PET VIC 64 128 Amiga**

Ypsilanti
Washtenaw Commodore Users' Group
4490 Oakengates Dr., MI 48197
**64 128**

### MINNESOTA

Apple Valley
Apple Valley Commodore Users' Group
15273 Dresden Way, MN 55124
**64 128**

Fridley
Amiga of Minnestoa Interest Groups Alliance
P.O. Box 32374, MN 55432
**Amiga**

Mendota
Metro-Area Commodore Computer Club
P.O. Box M, MN 55150

Rochester
Rochester Area Commodore Users' Group
2526 - 6th Ave., N.W., MN 55901
**VIC 64 128 Amiga**

Willmar
Commodore Users Therapy Group
1309 N. Gorton Ave., MN 56201
**VIC 64 128 Amiga**

### MISSISSIPPI

Biloxi
Coastline Commodore Computer Club
P.O. Box 114, MS 39533
**PET VIC 64 128 Amiga PC**

Hattiesburg
Hattiesburg Commodore Computer Club
Dept of Polymer Sci. USM
Box 100076 Southern Sta.
MS 39406-0076
**64 128 Amiga**

Jackson
Jackson Commodore Users' Group
P.O. Box 55734, MS 39216

### MISSOURI

Bridgeton
Gateway Amiga Club, Inc.
14850 Phelps, MO 63044
**Amiga**

Cape Girardeau
Heartland Users' Group
P.O. Box 443, MO 63701
**64 128 Amiga PC**

Columbia
Mid-Missouri Commodore Club
P.O. Box 7026, MO 65205-7026
**64 128**

Columbia
Columbia Commodore Users
P.O. Box 7633, MO 65205
**VIC 64 128 Amiga PC**

Joplin
Joplin Commodore Computer Users' Group
424 S. Florida Ave., MO 64801
**PET VIC 64 128 Amiga PC**

Lampe
Moark-Commodore Users' Group
H.C. Rt. 1, Box 85, MO 65681
**VIC 64 128**

Morehouse
Delta Bootheel Users' Group
P.O. Box 16, MO 63868
**PET VIC 64 128 Amiga PC**

North Kansas City
Commodore North Users' Group
P.O. Box 34534, MO 64116
**PET VIC 64 128**

St. Louis
Commodore Users' Group of St. Louis
P.O. Box 6653, MO 63125-0653

Warrensburg
Commodore Users' Group of Warrensburg
P.O. Box 893, MO 64093
**VIC 64 128 Amiga PC**

### MONTANA

Great Falls
Cascade County Commodore Users' Group
P.O. Box 739, MT 59403

Red Lodge
Grizzly Hackers
P.O. Box 1179, MT 59068
**64 128**

Stevensville
Missoula Commodore Users
310 8th St., MT 59870
**PET VIC 64 128 Amiga PC**

### NEBRASKA

Ainsworth
Sandhill Peeks & Pokes
237 N. Park Street, NE 69210
**VIC 64 128 Amiga PC**

Alliance
Alliance Commodore Computer Club
726 W. 16th St., NE 69301
**VIC 64 128**

Doniphan
Mid Nebraska Users of Commodore
P.O. Box 39, NE 68832

Fremont
Pathfinder Commodore Users' Group
P.O. Box 683, NE 68025

McCook
McCook Commodore Users' Group
1010 E. 2nd St., NE 69001
**VIC 64 128 Amiga**

Omaha
Greater Omaha Commodore Users' Group
P.O. Box 241155, NE 68123
**VIC 64 128 Amiga PC**

Omaha
Amiga Users of the Heartland
P.O. Box 1432 DTS, NE 68101
**Amiga**

### NEVADA

Carson City
Carson City Commodore Users' Network
P.O. Boox 2215, NV 89702

Fallon
C.A.T. F.U.N.
P.O. Box 2155, NV 89406

Las Vegas
Silver State Computer Users' Group
P.O. Box 81075, NV 89180

### NEW HAMPSHIRE

Bow
Commodore Users' Group
53 Page Rd., NH 03301

Keene
Monadnock Users' Group For Commodore Owners
135 Liberty Lane, NH 03431-4838
**64 128 Amiga**

### NEW JERSEY

Cherry Hill
Amiga Users' Group of South Jersey
P.O. Box 3761, NJ 08034
**Amiga**

Holland
Ewing Commodore Users' Group
528 Sugar Tree Rd., PA 18966
**64 128**

Linwood
C-64 Users' Group of South Jersey
312 Beech Ave., NJ 08221
**64 128 Amiga**

Matawan
Commodore Users' Group of Central New Jersey
112 Old Bridge Rd., NJ 07747
**PET VIC 64 128 Amiga PC**

Mount Tabor
Morris Area Users' Group
P.O. Box 492, NJ 07878
**PET VIC 64 128 Amiga PC**

Roosevelt
Commodore Computer Collection Club
72 Pine Dr., NJ 08555
**64 128 Amiga**

Sewell
GC64 Commodore Users' Group
P.O. Box 292, NJ 08080

Upper Montclair
Commodore Users' Group of North Jersey
P.O. Box 43024, NJ 07043
**PET VIC 64 128 Amiga**

Westwood
Commodore 64 Beginners Club
680 Leigh Ter., NJ 07675
**64 128**

### NEW MEXICO

Las Cruces
Aviation & Computer Enthusiasts
1220 Birch Dr., NM 88001
**64 128 Amiga PC**

Los Alamos
Los Alamos Commodore Users' Group
3974-C Alabama St., NM 87544

Taos
Taos Area Commodore Users' Group
P.O. Box 5089, NM 87571
**64 128 Amiga**

### NEW YORK

Blue Mountain
Adirondack C-64 Users' Group
P.O. Box 99, NY 12812

Bronx
Folklife Terminal Club
P.O. Box 555-MI Co-op City Station, NY 10475
**PET VIC 64 128 Amiga PC**

Brooklyn
Brooklyn Commodore Users' Group
1735 E. 13th St., Apt. 7-N, NY 11229
**VIC 64 128**

Conajoharid
Mohawk Valley Commodore Users' Group
100 Montgomery St., NY 13317

Franklin Square, LI
Users' Group of Dentists
119 Franklin Ave., NY 11010

Glen Cove
Landing Users' Group
17 Barlow Ave., NY 11542
**VIC 64 128**

Glendale
Queens Commodore Users' Group
75-11 64th St., NY 11385
**64 128**

Greene
NYTEC Users' Group
29 Juland St., NY 13778
**VIC 64 128**

Hammondsport
Finger Lakes Area Komputer Experts
86 W. Lake Rd., NY 14840

Holbrook
CLUB-64
1579 Coates Ave., NY 11741

Levittown
Associated Commodore Enthusiasts
37 Silver Ln., NY 11756

Messena
C.O.M.A.
Star Tech Systems
69 Main St., NY 13662

New York
New York Commodore Interest Group
115 Essex St., 146, NY 10002

New York
Technology Not Tricks
619 W. 114th St., NY 10025
**PET VIC 64 128**

New York
AMUSE
151 - 1st Ave., Suite 182, NY 10003
**Amiga**

Newark
Finger Lakes Commodore Users' Group
300 West Ave., NY 14513

Oceanside
Commodore Long Island Club
2949 Roxbury Rd., NY 11542
**64 128 Amiga PC**

Oneonty
Leatherstocking Commodore Users' Group
8 Moffat St., NY 13820
**PET VIC 64 128 Amiga**

Ossining
For Your Computer Only
35 Belleview Ave., NY 10562
**64**

Oswego
Oswego Commodore Users' Group
SUNY - 208 Park Hall, Dept. of Technology
NY 13126

Rochester
CUGOR
P.O. Box 23463, NY 14692
**VIC 64 128 Amiga**

Syracuse
Central New York Commodore Users' Group
6887 Peck Rd., NY 13209
**VIC 64 128 Amiga PC**

Vestal
Triple Cities Commodore Society
1713 Castle Gardens Rd., NY 13850
**64 128**

Wappingers Falls
Dutchess Commodore Users' Group
18 Cindy Ln., NY 12590
**VIC 64 128**

Watertown
Syndacate
109 Stuart St., NY 13601
**PET VIC 64 128 Amiga PC**

Westtown
Commodore 64 Users' Group of Orange County
R.D. 1, Box 105, NY 10998-9710
**64 128 Amiga**

Woodhaven
D-BUG
78-23 91st Ave., NY 11421

### NORTH CAROLINA

Greensboro
Triad C-64 Users' Group
3302 Forsyth Dr., NC 27407

Havelock
Down East Commodore Users' Group
P.O. Box 1255, NC 28532

Hickory
Unifour Commodore Users' Group
P.O. Box 9324, NC 28603-9324
**VIC 64 128 Amiga PC**

Jacksonville
Greater Onslow Commodore Users' Group
P.O. Box 7171, NC 28540
**VIC 64 128 Amiga**

Salisbury
Salisbury Compute
Rt. 1, Box 349-B, NC 28144
**VIC 64 128 Amiga**

Sanford
Sanlee Commodore Club
5822 Bluejay Dr., NC 27330
**VIC 64 128 Amiga**

### OHIO

Ashtabula
Ashtabula County Users' Group
1231 Columbus Ave., OH 44004
**VIC 64 128**

Barberton
Computer Technology Utilization Group
547 Wooster Rd., N., OH 44203
**VIC 64 128 Amiga**

Bellbrook
Dayton Area Commodore Users' Group
2160 Waynesville Rd., OH 45305
**PET VIC 64 128 Amiga PC**

Brookville
C-BUG
12368 Brookville-Pyrmount Rd., OH 45309

Cincinnati
UCOM-64
340 Tangeman University Cir., 136, OH 45221

Cincinnati
Ohio Valley Amiga Users' Group
P.O. Box 428539, OH 45242-8539
**Amiga**

Columbus
Central Ohio Commodore Users' Group
P.O. Box 28229, OH 43228-0229
**PET VIC 64 128 Amiga PC**

Dayton
Page Manor Users' Group
P.O. Box 31744, OH 45431
**VIC 64 128 Amiga**

Marion
Marion Ohio Commodore Users' Group
775 Wolfinger Rd., OH 43302

Mentor
Northwest Ohio Commodore Users' Group
P.O. Box 718, OH 44061-0015

New Philadelphia
Commodore Users' Group
702 Park Ave., N.W., OH 44663
**PET VIC 64 128 Amiga PC**

North Canton
Canton/Akron/Massillion Area Users' Group
P.O. Box 2423, OH 44720
**64 128 Amiga**

North Ridgeville
Basic Bits Commodore Group
5564 Wallace Blvd., OH 44039
**VIC 64 128 Amiga**

Sandusky
Firelands Amiga Users' Group
1717 E. Perkins Ave., OH 44870
**Amiga**

Sandusky
Commodore Erie Bay Users' Group
P.O. Box 1461, OH 44870

Springfield
C.H.U.G.
P.O. Box 2238, OH 45507
**PET VIC 64 128 Amiga**

Toledo
Commodore Computer Club of Toledo
P.O. Bxo 8909, OH 43623
**PET VIC 64 128 Amiga PC**

### OKLAHOMA

Altus
Commodore Users' Group of Altus
P.O. Box 913, OK 73522
**VIC 64 128**

Bartlesville
Commodore Users of Bartlesville
1704 S. Osage, OK 74003
**64 128 Amiga PC**

Lawton
Commodore Users' Group of Lawton
P.O. Box 3392, OK 73501
**64 128**

Oklahoma City
Amiga Computer Enthusiasts
P.O. Box 760533, OK 73176
**Amiga**

### OREGON

Corvallis
Albany-Corvallis Users' Group
P.O. Box 1124, OR 97339

Eastside
Coos Computer Club
P.O. Box 4066, OR 97420
**PET VIC 64 128 Amiga PC**

Eugene
Lane County Commodore Users' Group
P.O. Box 11316, OR 97440
**64 128**

Florence
Siuslaw Commodore Users' Group
84226 Clear Lake Rd., OR 97439

Oregon City
Northwest Amiga Group
P.O. Box 1140, OR 97045
**Amiga**

St. Helens
Columbia County Commodore Club
424 S. 17th St., OR 97051
**64 128 Amiga**

### PENNSYLVANIA

Bethlehem ABC C-64 Chips
3159 Middletown Rd., R.D. 3, PA 18017
**VIC 64 128 Amiga**

Clarks Summit
Scranton Commodore Users' Group
P.O. Box 211, PA 18411
**64 128 Amiga**

Clifton Heights
C.H.U.G.
P.O. Box 235, PA 19018
**PET VIC 64 128 Amiga PC**

Erie
North Coast Commodore Users' Group
P.O. Box 6117, PA 16511-6117

Feasterville
Lower Bucks Users' Group
P.O. Box 548, PA 19047

Greensburg
Westmoreland Computer Users' Club
P.O. Box 3051, PA 15601

Hanover
Hanover Commodore Users' Group
102 Edward Street, PA 17331
**VIC 64 128 Amiga**

Hatfield
Upper Buxmont C-64 Users' Group
1206 Cowpath Rd., PA 19440
**64 128 Amiga PC**

Indiana
Indiana Commodore Users' Group
Box 1293, PA 15701

Jersey Shore
Central Pennsylvania Users' Group For Commodore
R.D. #4, Box 99A, PA 17440
**64 128 Amiga PC**

Lemoyne
Capital City Comics
900 Market St., PA 17043

Lemoyne
Capitol Area Commodore Club
P.O. Box 333, PA 17043
**VIC 64 128**

New Kensington
AK-64 Users' Group
1762 Fairmont Street, PA 15068

Parksburg
Lighthouse Users' Group
103 Peacemaker Dr., PA 19365

Philadelphia
SUB-64
P.O. Box 54208, PA 19105
**VIC 64 128 Amiga**

Pittsburgh
Bettis Commodore Users' Group 592 Arbor Ln., PA 15236
**64 128**

Sayre
I.R. Users' Group
402 S. Keystone Ave., PA 18840
**PET VIC 64 128 Amiga PC**

Uniontown
Uniontown Commodore Group
P.O. Box 1500, PA 15401

West Wyomising
Commodore Users' Group of Berks
2455 McKinleny Ave., PA 19609

West Chester
Computer Users' of Fugett & Friends
Fugett Middle School, 500 Ellis Ln., PA 19380
**PET VIC 64 128**

West Chester
Main Line Commodore Users' Group
1046 General Allen Lane, PA 19382
**PET VIC 64 128 Amiga**

Williamsport
West Branch Commodore Users' Group
P.O. Box 995, PA 17703

York
White Rose Commodore Users' Group
1421 Second Ave., PA 17403
**64 128 Amiga PC**

### RHODE ISLAND

Newport
Newport Computer Club
P.O. Box 1439, RI 02840-0997
**64 128**

### SOUTH CAROLINA

Columbia
Commodore Computer Club of Columbia
318 Quincannon Drive, SC 29210
**VIC 64 128**

Rock Hill
Rock Hill Commodore Users' Group
417 S. Spruce St., SC 29730
**VIC 64 128**

Spartanburg
Spartanburg Commodore Users' Group
P.O. Box 319, SC 29301
**VIC 64 128 Amiga PC**

### SOUTH DAKOTA

Rapid City
Port-64
1705 Cruz Dr., SD 57702

### TENNESSEE

Big Sandy
Club West
Route 2, Box 128-B, TN 38221
**64 128**

Estill Springs
Commodore Users' Club
P.O. Box 96, TN 37330
**64 128**

Germantown
Memphis Amiga Group
P.O. Box 381462, TN 38138-1462

Jackson
Old Hickory Commodore Users' Group
542 Lambuth Blvd., TN 38301
**64 128**

Memphis
Commodore Asociation of the Mid-South
3318 Keystone Ave., TN 38128
**VIC 64 128**

Memphis
Raleigh-Bartlett Hackers
Commodore Users' Group
3457 Gatewood Dr., TN 38134
**64 128**

Memphis
Memphis Commodore Users' Group
P.O. Box 34095, TN 38134-0095

Millington
Millington Commodore Users' Group
7770 West Navy Cr., TN 38053
**VIC 64 128**

Nashville
Nashville Commodore Users' Group
P.O. Box 121282, TN 38305

Springfield
Springfield Commodore Users' Group
P.O. Box 62, TN 37172
**64 128**

### TEXAS

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P.O. Box 8971, TX 79114-8971

Austin
Central Texas Amiga Computer Society
1704 Taylor Gaines St., TX 78741
**Amiga**

Bay City
Bay City Commodore Users' Group
2211 Gontier Drive, TX 77414
**PET VIC 64 128 Amiga**

Bedford
Mid-Cities Commodore Club
P.O. Box 1578, TX 76021
**64 128 Amiga**

El Paso
El Paso Commodore Users' Group
P.O. Box 370934, TX 79937
**PET VIC 64 128 Amiga PC**

Gainesville
Cooke County Commodore Users' Group
1004 S. Howeth Street, TX 76240-5904

Longview
Longview Users' Group
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Lubbock
Commodore Users' of Texas
Rt. 12, Box 64, TX 79424
**PET VIC 64 128 Amiga PC**

Pampa
Top of Texas Commodore Users' Group
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**PET VIC 64 128 Amiga PC**

Sherman
Sherman Commodore Users' Group
800 Hwy. 1417, Apt. 211 Bldg 2, TX 75090
**64 128**

Texarkana
Ark-La-Tex Commodore Users Exchange
P.O. Box 6473, TX 75505
**PET VIC 64 128 Amiga PC**

Waco
Heart of Texas Home Users' Group
332-D Richland Drive, TX 76710

West
West Commodore Users' Group
Route 1, Box 97-B, TX 76691
**64 128**

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Cache Valley Computer Club
467 N. 200 W., UT 84321

Salem
PAC 64
P.O. Box 525, UT 84653
**64 128**

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Champlain Valley Commodore Users' Group
6 Mayfair Street, VT 05401
**VIC 64 128 Amiga PC**

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5521 Harvey Lane, VA 22312

Blacksburg
New River Valley Commodore Users' Group
506 Cranwell Cir., VA 24060-5505
**64 128 Amiga**

Bristol
TriNet
P.O. Box 503, VA 24203

Charlottesville
Piedmont Commodore Group
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Dale City
Dale City Commodore Users' Group
P.O. Box 2265, VA 22193-0265
**PET VIC 64 128 Amiga**

Hampton
Peninsula Commodore Users' Group
P.O. Box L, VA 23666
**PET VIC 64 128 Amiga PC**

Haysi
Black Diamond Commodore Society
Rt 2, Box 628, VA 24256

Herndon
AMC Commodore Club
2903 Rock Manor, VA 22071
**64 128**

Lebanon
Commodore Hilltop Users' Group
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**PET VIC 64 128 Amiga PC**

Richlands
Bits & Bytes
P.O. Box 625, VA 24641

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T.R.A.C.E.
2316 Lafayette Avenue, VA 23228

Richmond
C.U.R.V.E.
P.O. Box 28284, VA 23228

Virginia Beach
Tidewater Commodore Users' Group
P.O. Box 61814, VA 23462
**VIC 64 128 Amiga**

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Commodore Bellingham Users' Group
P.O. Box 2756, VA 98227
**VIC 64 128**

Burley
Commodore Users' of Puget Sound
P.O. Box 86, VA 98322

### WASHINGTON

Olympia
Olympia Commodore Users' Group
1822 Eastwood Place, WA 98501
**64 128 Amiga PC**

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Tri-State Commodore Users' Group
555 Irene St., WI 53818

Sheboygan
Lakeshore Commodore Club
Route 1, WI 53081
**PET VIC 64 128 Amiga PC**

*Continued from pg. 73*

```
     :PRINT#4,SPC(5),;FF$'EPBV
955 PRINT#4'BBDN
960 PRINT"[CLEAR]":GOSUB 1450
    :GOTO 140'DJWN
970 PRINT"[RVS] REM <[POUND]
    > KEY TO ESCAPE, <RETURN>=PRINT
    [SPACE2]":PRINT'CBDV
980 GOSUB 1430:PRINT"[CLEAR]"'CFMN
985 OPEN 4,4,0:PRINT"[RVS,SPACE2]
    CUSTOM LETTERHEAD MODE IS NOW
    ACTIVE"'CGKD
990 PRINT:INPUT"[RVS] E=ENHANCED,
    N=NORMAL, [POUND]=QUIT, (E/N/
    [POUND]) ";M$'CEAX
1000 IF M$<>"E"AND M$<>"N"AND M$<>"
     [POUND]"THEN 990'KJMC
1010 IF M$="[POUND]"THEN 1130'DGSW
1020 IF M$<>"E"THEN 1030'EGRY
1025 PRINT#4,CHR$(31)+CHR$(14)
     :PRINT"[RVS] TYPE IN UP TO 19
     .SPACES MAX"'FLLM
1030 IF M$<>"N"THEN 1040'EGBA
1035 PRINT#4,CHR$(31)+CHR$(15)
     :PRINT"[RVS] TYPE IN UP TO 59
     .SPACES MAX"'FLQN
1040 AN$=""'BDAX
1050 GET A$:IF A$=""THEN 1050'EJDC
1060 AN$=AN$+A$:PRINT A$;
     :IF A$=CHR$(13)THEN 1100'HXPI
1070 IF A$<>CHR$(20)THEN 1080'FKLF
1075 A$="":AN$="":PRINT
     :PRINT"[RVS] RE-TYPE LINE PLEASE
     ":GOTO 1040'FNKQ
1080 IF A$="[POUND]"THEN AN$=""
     :A$=""GOTO 1120'GMSH
1090 GOTO 1050'BEDD
1100 IF M$="E"THEN XT=INT(10-(LEN(AN$)
     /2)):PRINT#4,SPC(XT),;AN$
     :GOTO 990'LGUI
1110 IF M$="N"THEN XT=INT(30-(LEN(AN$)
     /2)):PRINT#4,SPC(XT),;AN$
     :GOTO 990'LGGJ
1120 PRINT"[CLEAR]":GOSUB 1450
     :GOTO 140'DJWA
1130 PRINT"[RVS] SHOULD I DRAW A LINE
     ACROSS THE TOP,[SPACE2]"'BAEH
1140 PRINT"[RVS] TO SEPARATE THE
     LETTERHEAD (Y/N) [SHFT SPACE]?
     [SPACE3]"'BATI
1150 GET A$:IF A$=""THEN 1150'EJED
1160 IF A$<>"Y"THEN 1170'EGEE
1165 PRINT#4,CHR$(14)CHR$(159)
     :FOR X=1 TO 40:PRINT#4,"[CMDR @]
     ";:NEXT:GOTO 1120'JBBQ
1170 GOTO 1120'BEBC
1180 GOSUB 1430:PRINT"[CLEAR]"
     :OPEN 4,4,0:PRINT#4,CHR$(31)'FSAJ
1190 PRINT"[RVS] TYPEWRITER WITH
     NORMAL PRINT NLQ MODE[SPACE2]
     "'BAOO
1200 PRINT"[RVS] IS NOW ACTIVE. TYPE
     IN UP TO 80 COLS.[SPACE2]"'BAMF
1210 PRINT"[RVS] REM <[POUND]
     > KEY TO ESCAPE, <RETURN>=PRINT
     [SPACE2]":PRINT'CBDH
1220 AN$=""'BDAX
1230 GET A$:IF A$=""THEN 1230'EJDC
1240 AN$=AN$+A$:PRINT A$;'DMDD
1250 IF A$=CHR$(13)THEN PRINT#4,AN$
     :GOTO 1220'GQWG
1260 IF A$=CHR$(20)THEN PRINT
     :PRINT"[RVS] RE-ENTER LINE
     [WHITE]":GOTO 1220'HMNL
1270 IF A$="[POUND]"THEN AN$="":A$=""
     :GOTO 1290'GNJI
1280 GOTO 1230'BEDE
1290 PRINT#4,CHR$(15):PRINT"[CLEAR]"
     :GOSUB 1450:GOTO 140'FQWK
1300 GOSUB 1430:PRINT"[CLEAR]"
     :OPEN 4,4,0:PRINT#4,
     CHR$(31)+CHR$(14)'HWOF
1310 PRINT"[RVS] TYPEWRITER WITH
     ENHANCED PRINT NLQ MODE"'BALI
1320 PRINT"[RVS] IS NOW ACTIVE. TYPE
     IN UP TO 40 COLS.[SPACE2]"'BAII
1330 AN$=""'BDAA
1340 GET A$:IF A$=""THEN 1340'EJFE
1350 AN$=AN$+A$:PRINT A$;'DMDF
1360 IF A$=CHR$(13)THEN PRINT#4,AN$
     :GOTO 1330'GQYI
1370 IF A$=CHR$(20)THEN PRINT
     :PRINT"[RVS] RE-ENTER LINE
     [WHITE]":GOTO 1330'HMPN
1380 IF A$="[POUND]"THEN AN$=""
     :GOTO 1400'FKVJ
1390 GOTO 1340'BEFG
1400 PRINT#4,CHR$(15):PRINT"[CLEAR]"
     :GOSUB 1450:GOTO 140'FQWD
1410 P=LEN(K$):TX=40-P/2
     :FOR D=1 TO LEN(K$)-20'KVMJ
1420 PRINT XR$SPC(TX)LEFT$(K$,
     D)RIGHT$(K$,P-(P-D)):TX=TX-1:NEXT
     :RETURN'KFOM
1430 FOR X=1124 TO 2044 STEP 80'ELJE
1440 FOR L=19 TO 0 STEP-1:POKE X-L,32
     :POKE X+L,32:NEXT:NEXT
     :RETURN'MUBM
1450 OPEN 10,4,10:PRINT#10:CLOSE 10
     :CLOSE 4:X=0:I=0:P=0:L=0:Z=0:M=0
     :N=0:KK=0'MPRT
1460 XT=0:A$="":B$="":AN$="":FF$=""
     :TX=0:CV$="":XR$="":RETURN'JFTQ
1470 PRINT#4:PRINT#4,"ADD THE NUMBER
     AT THE TOP TO THE NUMBER AT THE
     SIDE"'CEXT
1480 PRINT#4:PRINT#4,"FOR THE PROPER
     LOCATION ON THE 40 COLUMN
     SCREEN."'CENT
1485 RETURN'BAQK
1490 OPEN 6,4,6:PRINT#6,CHR$(22)
     :CLOSE 6:RETURN'FPFM
1500 GOSUB 1450:PRINT"[CLEAR]"
     :PRINT"[HOME,RIGHT2,DOWN2,RVS]
      END PRINTING LAB..."
     :X=PEEK(65534)'FPXK
1510 IF X=72 THEN SYS 64738'EIDD
1520 IF X=23 THEN SYS 65341'EIPE
```

END

*Continued from pg. 16*

PLAY key will be read and the appropriate video output will be activated. You can't find that in the manual!

Also on the 128, you can escape from an INPUT statement without affecting the screen or sound. Just hold down STOP and press the ENTER key on the numeric keypad. (This trick doesn't work with the RETURN key, which for most other purposes is identical to ENTER.)

It's possible to alter the actions described above, and many creative programmers have done so. The STOP key can be disabled and so can the RESTORE key. RESTORE can be given an entirely new meaning and RUN can be simulated from within a program. Full coverage of these subjects is beyond our scope at this time, but here are some tidbits for the 64.

```
POKE 808,239 disables STOP
POKE 808,225 disables STOP/RESTORE
POKE 808,127 disables RUN
POKE 808,237 undoes any or all of the above
POKE 816,32 causes RUN to run what's in memory
```

The 128's TRAP statement can be used to disable its STOP key, and its programmable function keys can easily LOAD or RUN whatever program you'd like.

*Louis F. Sander*
*Pittsburgh, Pennsylvania*

**Automatic line listing:** When writing or improving a program, I find myself repeatedly listing certain groups of lines. This becomes much easier when I don't have to type the LIST command in full.

The easiest way is available only to owners of the 128, Plus/4 or any computer whose function keys print information on the screen. Just enter something like this from the keyboard in direct mode:

```
KEY 1, "LIST 2000-2150" + CHR$(13)
```

From then on, you can list lines 2000-2150 just by pressing the F1 key. The + CHR$(13) at the end of the line simulates pressing the RETURN key after the LIST command is printed to the screen. If you prefer to press RETURN yourself, just leave that part out of your key definition. Of course, you should substitute your own line numbers for the ones in this example.

When you no longer have much need to list your original range of lines (2000-2150 in our example), you can redefine KEY 1 to print a different range. You can put different line number ranges on other function keys by executing similar statements with different numbers after the KEY command.

You can also use this system to get printer listings of all or part of your program. Just do something like this:

```
KEY 2, "OPEN 4,4 : CMD 4 :"
```

Now pressing the F2 key will put those commands on the screen with the cursor blinking right after the final colon. To list your program to the printer, type LIST and hit the RETURN key. If you've put a LIST command on another function key, just press that key at this point and your listing will print on the printer!

If you don't have easily programmable function keys, you can use one of these two alternate methods for getting easy listings. The first is to start your program with one or more lines like this:

```
0 GOTO 100
1 LIST 2000-2150
2 LIST 3000-3999
3 OPEN 4,4 : CMD 4 : LIST 2000-2150
4 etc.
100 REM REGULAR PROGRAM STARTS HERE
```

When you run the program in the normal way, line 0 will bypass your special additions. To get a listing of lines 2000-2150, just RUN 1. To get a printed listing, RUN 3. You can extend this as far as you'd like, and it can save a lot of repeated typing.

On the Commodore 64, executing a LIST from program mode will terminate program execution, so you don't need an END statement at the end of your special listing lines. But other computers, notably the 128, do not terminate execution after LIST. If yours is one of them, you'll need to add an END or STOP at the end of each of the listing lines.

The third way to get automatic listing is a variation on the one above. Instead of the lines shown there, use these:

```
0 GET A$ : IF A$ = "" THEN 0
1 IF A$ = "A" THEN LIST 2000-2150
2 IF A$ = "B" THEN LIST 3000-3999
3 IF A$ = "C" THEN OPEN 4,4 : CMD 4 : LIST 2000-2150
4 etc.
100 REM REGULAR PROGRAM STARTS HERE
```

Now when you run the program, nothing happens until you press another key. When you press A, B, C or any of the keys specified in your IF statements, the appropriate lines will be listed. If you press any other key, the program will fall through to line 100, and the regular part of the program will be executed.

I've used all three methods at various times, and they've saved me thousands of seconds and keystrokes. I hope you can use them as productively.

*Bernie Griwatz, Jr.*
*McCandless, Pennsylvania*

**Dump those variables:** When debugging a program, it's often helpful to know the value each variable had when the program stopped running. Amazingly, all you need to do is ask! When a program stops due to a crash or a normal termination, the computer remembers the values of every variable the program has set. You can see the values yourself by executing the appropriate direct mode statements. To see the value of F, just type PRINT F. To see KM$, type PRINT KM$. If you want to look at an entire array, say L(S), do something like this:

```
FOR S = 0 TO 10 : PRINT S,L(S) : NEXT
```

As long as you are careful, you can explore the variables as thoroughly as you'd like. The care is required because certain normally innocuous actions can reset all the variables to zero. On the 64, for example, if you make any changes to the program, all the variables are reset. Such changes include adding a line, deleting a line, or even changing a line. When you do any one of them, it's goodbye time for your variables.

128 owners are lucky here, because BASIC 7.0 retains all variable values even when lines are changed. That feature makes for some delightfully easy debugging, if such a thing can exist. But be careful here as well—if you're working in 64 mode, this feature isn't present.

If you need to check a lot of variables, you can automate the process by adding some lines like these to your program:

```
49999 END
50000 PRINT "KM = " ; KM
50010 PRINT "ML = " ; ML
50020 PRINT "L$ = " ; L$
50030 STOP
```

When your program stops and you need to dump these variables, just do a direct mode GOTO 50000 (GOTO doesn't reset your variables; RUN does).

I've used these tricks many times over the years, and they've saved me countless hours of debugging time. I hope they work as well for you.
*Christopher Mead*
*Athens, Ohio*

**Wind chill calculator:** Tell this program the temperature and the wind velocity and it will tell you the wind chill temperature.

Wind chill is a means of expressing the cooling effect of the combination of wind and low temperature, each of which causes a loss of heat. For example, if it's 10 degrees outside and the wind is blowing at 25 miles per hour, the cooling effect is the same as if it were −29 degrees with no wind. The −29 is referred to as the wind chill temperature for that combination of conditions. (I tested this program against a chart in *The World Almanac* and it never varied by more than one degree—LFS.)

Readers in cooler parts of the Southern Hemisphere can use the program as soon as they get this issue. Yankees and other Northern Hemisphere computerists will have to wait until winter. Here in Houston, we don't have much call for it at all, y'all.
*Billy D. Mullins*
*Houston, Texas*

```
10 PRINT"[CLEAR,RVS]WIND CHILL
   CALCULATOR - BILLY D. MULLINS
20 INPUT"[DOWN]TEMPERATURE IN DEGREES
   F";T
30 INPUT" WIND VELOCITY IN M.P.H.";V
40 T1=T:V1=(V*1609.35)/3600
   :TC=33-((T-32)*(5/9))
50 H=(10.45+(10*SQR(V1))-V1)*TC
   :X=H-506.784:IF X<0 THEN X1=T1
   :GOTO 70
60 X1=50-(X/12.3):X1=INT(((X1*10)+5)
   /10)
70 PRINT"[SPACE2]WIND CHILL
   TEMPERATURE=";X1
```

**128 Happy Birthday:** If you enter the accompanying program, you'll get a nice rendition of Happy Birthday. By adding these two lines, you'll hear it on ten different instruments:

5 FOR J=0 TO 9 : PLAY "T"+STR$(J)
15 SLEEP 2 : NEXT J

*Alejandro Ozerkovsky*
*Adler Mexico City, Mexico*

```
10 TEMPO 25:FOR K=1 TO 2
   :PLAY"MO4V1QGGHAGO5CO4WBQGGHAGO5HD
   WCO4QGGO5HGEQCCO4HBAO5QFFHECDWC"
   :NEXT:REM HAPPY BIRTHDAY -
   ALEJANDRO OZERKOVSKY A.
```

**QuantumLink password:** If you have a 128 and a QuantumLink subscription, you can get on-line just by inserting your disk and turning on the computer. No additional effort is required of you at all. If you have small children, this can make for trouble if they know a little about the computer.

The Q-Link disk contains a BASIC program called BOOT64 which can be modified and resaved to avoid the problem. The accompanying listing gives a program that asks for a password before getting on-line. The password is KATHLEEN, but you can change it to anything you'd like. You can add it to your Q-Link disk by typing it in then entering:

SAVE "@ 0:BOOT64"

*Bill Pl*
*Vienna, Virginia*

```
10 REM BOOT 64 - BILL P1
20 IF A=1 THEN NEW
30 INPUT"[CLEAR]SECURITY CODE";C$
40 IF C$="KATHLEEN" THEN A=1
   : LOAD"QUANTUM",8,1
50 NEW
```

**1571/64 speed report:** In most applications, the 64 can't take advantage of the 1571 disk drive's speed advantage over the older 1541. Programs, for example, will load into your 64 just as fast from a 1541 as they do from a 1571. But there are some areas where the 1571 has a speed advantage over the 1541, even when used with a 64.

While the 1541 takes about 1:12 to format a disk, the 1571 does the job in only 0:43. And there is a similar advantage when validating a disk. One of my disks could be validated on the 1571 in 1:22, compared to 1:37 for the 1541. Unlike formatting time, of course, validating time depends on what's recorded on the disk in the first place.
*Lucy S. Terrier*
*Alton, Illinois*

**Disconnection discombobulation:** Have you encountered those commercial programs that won't run unless everything is disconnected from the serial bus? Every time you want to run one, you have to disconnect your printer, your second disk drive, and anything else you might have connected to the computer.

The only thing worse than disconnecting all that equipment is listening to the people who say they don't have to disconnect it, even with the same program you have.

When my computer was in the shop last month, I discovered something that might explain the discrepancy. I use a 128 with a 1571 drive, and I routinely have a second disk drive (a 1541) and an MPS801 printer connected to my serial bus. I'm a frequent user of QuantumLink (in 64 mode), and although I had heard of the need to disconnect everything before loading the Q-Link software, I had never had to disconnect anything in my own setup. I attributed all the disconnection advice to people who didn't know what they were talking about.

But when my 128 and 1571 went into the shop, I replaced them temporarily with a 64 and a 1541, leaving my printer attached to the serial bus. Every time I attempted to access Q-Link, my system hung up while loading the software. A call to Customer Service yielded the advice to disconnect the printer. Given my previous experience, I followed this advice very reluctantly. Imagine my surprise when it worked! Once I unplugged that printer cable, the software behaved perfectly. Whenever I plugged it back in, the previous problem returned.

When my other equipment returned from the shop, I connected everything up (including a second drive and the printer), and had no further trouble loading the software.

The moral of the story seems to be this. When the software people say to disconnect those cables, they probably know what they're talking about. But, depending on your equipment, it might not be required. So try things both ways and see how much disconnecting you really have to do.

*Lil Willard*
*Marietta, Ohio*

**Graph paper maker:** If your printer can handle the graphics characters on the Commodore keyboard, the accompanying program will create graph paper in almost any size you need. If your graph is less than 39 squares wide, it will be centered horizontally on the page.

When typing the program, be very careful not to overlook the many semicolons. Also, don't try to abbreviate the PRINT# statement.

*Joseph R. Charnetski*
*Dallas, Pennsylvania*

```
10 PRINT"[CLEAR,RVS]GRAPH PAPER MAKER
   - JOSEPH R. CHARNETSKI"
20 INPUT"[DOWN2]HOW MANY SQUARES
   ACROSS";X
30 IF X>39 THEN X=39
40 INPUT"[DOWN,SPACE2]HOW MANY
   SQUARES DOWN";Y
50 C1$="[CMDR G]":C2$=CHR$(8)
   :C3$=CHR$(15):M=40-X
60 OPEN 4,4:PRINT#4:PRINT#4,SPC(M);
70 FOR ROW=1 TO Y : FOR COL=1 TO X
80 PRINT#4,"[SHFT O,CMDR Y]";:NEXT
90 PRINT#4,C1$;C2$:PRINT#4,C3$;SPC(M);
100 FOR J=1 TO X : PRINT#4,C1$;" ";
    :NEXT
110 PRINT#4,C1$;C2$:PRINT#4,C3$;
    SPC(M);:NEXT
120 FOR J=1 TO X*2 : PRINT#4,"[CMDR T]
    ";:NEXT
130 PRINT#4:CLOSE 4
```

**Colorful printouts:** I have one of those nice programs that makes borders, designs and greeting cards on my printer. By using colored paper, I can get a very nice effect in many cases. I can add to the effect by using colored markers to highlight or color in certain areas of the designs.

But I made my biggest step forward when I bought several colored ribbons for my printer. Now I put in a colored ribbon and print my border. Then I change ribbons, reload the same piece of paper, and print another part of the design. I repeat this for as many colors as I have ribbons, and the result is a full-color picture from a non-color printer and software.

There is one caution here—most computer stores don't carry colored ribbons. I found mine at a local store that specializes in ribbons for various types of office equipment. Some mail order houses also handle them.

*Arthur McMahon*
*Escondido, California*



*Continued from pg. 113*

# Electronic Music Recordings

For those of you who would like to hear samples of music that have been created and performed using computers and synthesizers, here is a short list of new-age electronic music recordings by some of the more popular artists to date. The list includes recordings of compositions that were either written using computers as the compositional tool, used computers and synthesizers in the actual performance, or a combination of both. The list is not definitive by any means, and I suggest that you check with your local record store for more titles. I have all of these and think that they are all still in print. The only one that is questionable is *Cords from Larry Fast* and *Synergy.*

*Atmospheres*
Various Artists
CBS FXM-42313

*Cords*
Larry Fast/Synergy
Passport PB 6000

*Metropolitan Suite*
Larry Fast/Synergy
Audion SYN-204

*Fripp and Eno (No Pussyfooting)*
Robert Fripp & Brian Eno
E.G. Records LTD EGS 102

*In Suspect Terrain*
Michael Shrieve
Relativity EMC 8100

*Safety in Numbers*
David Van Tieghem
Private Music 2015-1-P

*The Tomita Planets*
(Holst: The Planets)
Isao Tomita
RCA ARL1-1919

*Mussorgsky: Pictures at an Exhibition*
Isao Tomita
RCA ARL1-0838

*Journey to the Centre of the Earth*
Rick Wakeman
A&M SP-3156

*Switched on Brandenburgs*
Wendy Carlos
Columbia PG-31234

*Security*
Peter Gabriel
W/Larry Fast
Geffin GHS 2011

# Musical Starstreams

If you would like to get a taste of the type of music that can be produced using a intelligent instrument like *Music Mouse*, there is a syndicated show that is being made available to many radio stations across the nation. The show is called "Musical Starstreams" and is produced in the San Francisco area.

Not all of the music played during the two-hour show is electronically produced, but there is enough that you will get a good idea of what *Music Mouse* is capable of.

For $1.00, you can get single program transcripts that list the music that is played in a given show along with a catalog of "New Age" music-related videos and recordings, and a listing of the stations that are currently broadcasting the show. They also offer a one-year subscription to the transcripts (52 weeks) and include at least two copies of the "Musical Starstreams" newsletter with the transcripts and catalogs for $20.00.

The address to contact to find out if any radio stations in your immediate area are broadcasting "Musical Starstreams" is:

Musical Starstreams
P.O. Box 44
Mill Valley, CA 94942

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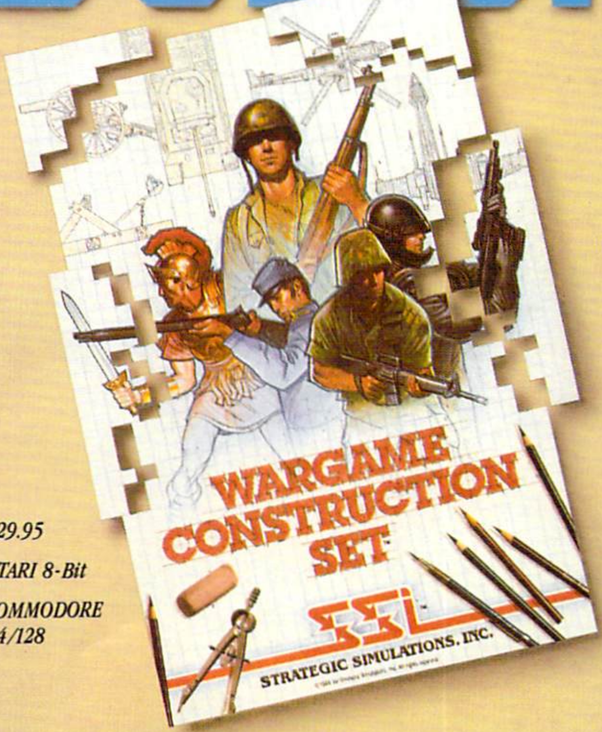


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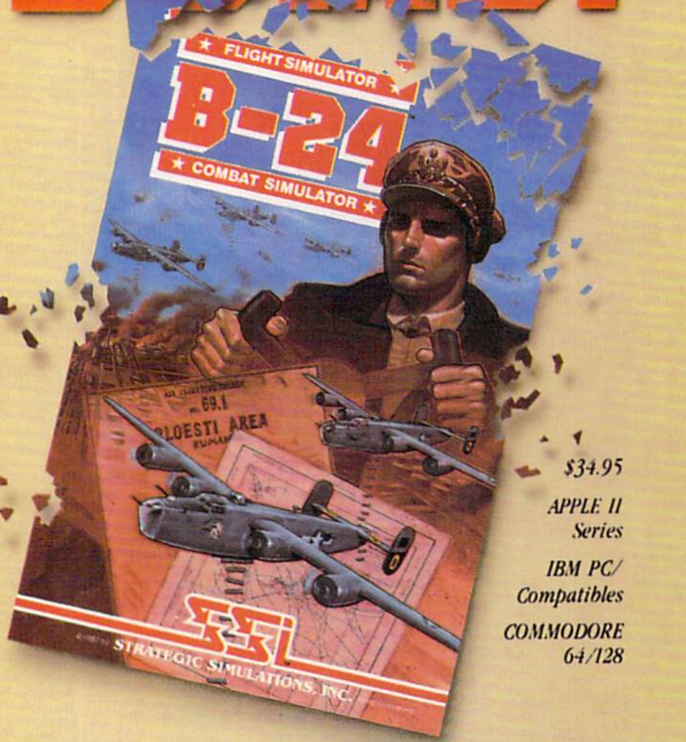
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Once you're in the air, your first goal is to form up with your bomber group and race to the fighter rendezvous points. Your escort fighters can only stay up for a limited time, so don't be late.

If you get hit, you'll have to decide whether to bail out or stick it out and do your job — reducing Ploesti's total oil production below what was accomplished historically. If you succeed, you'll be told how much you would have shortened the war in Europe!

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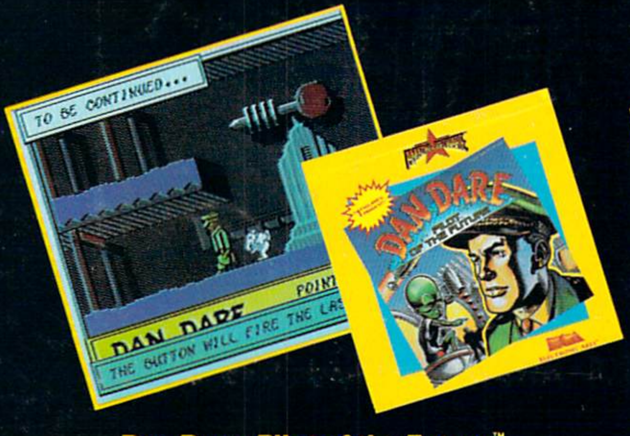
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